

**Application and Assessment of Hansen Software  
for  
Naval Material Management**

**A Research Report**

**Department of Civil Engineering  
North Carolina State University  
Raleigh, NC**

**by  
Alex Kuriatnyk  
and  
Dr. William Rasdorf**

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# **Biography**

## **Alex Kuriatnyk**

I attended the University of Akron during the years 1994 through 1998, and was awarded a Bachelor of Science Degree in Mechanical Engineering in December 1998. During my sophomore year I was accepted in the Navy Civil Engineer Corps collegiate program to pursue a Naval Officer Career in Engineering. After graduation I started Officer Candidate School (OCS) in Pensacola, FL for 12 weeks of both intensive mental and physical training. After completion of OCS in May of 1999 I received my commissioning as an Ensign in the United States Navy.

My Naval assignments have included Assistant Resident Officer in Charge of Construction (AROICC) and Assistant Public Works Officer during the years 2000 through 2002 in Lakehurst, NJ. In December of 2002, I was sent to Fort Benning, GA to run a design management section for the United States Army. During my tour with the Army I was sent to Kuwait as the Design Chief in anticipation of the Iraq war. I was in the war for seven months and my final station in Iraq was an air field in Tallil which is located about 300 miles south of Baghdad.

After returning from the war I finished my tour with the Army in December of 2004. The Navy offered me the opportunity to attend graduate school. I applied to and was accepted at North Carolina State University starting the spring of 2005. I plan to graduate in December of 2005 with a Master's Degree in Construction Engineering and Management.

I have been married for 15 years to the former Christy Persing of Niles, OH; I have 2 children, Alexiss age 14 and Derringer age 12. My family resides in Ellerslie, GA, which is approximately 90 miles south and west of Atlanta.

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## 1.0 Introduction

This section introduces the Hansen Information Technologies Company. It discusses the market sectors served by the company's products and presents in detail a discussion of their government operations software.

### 1.1 An Overview of the Hansen Information Technologies Company

Hansen is a leading supplier of application software to assist management operations in governmental agencies. Hansen supports over 500 governmental agencies that include state, county, city and special districts, covering over 80 million people who conduct billions of transaction a year. The company is a privately held company that employs approximately 250 people and is headquartered in Sacramento, California, with other offices located throughout the world. According to Hansen they offer the best solution for enterprise government applications. Their products are constantly rated the best in the industry by their customers and by consulting firms. They have been designing software for over 20 years for the government and their strong financial background makes them a solid partner that is expected to remain solvent for years to come.

Hansen was able to develop a software suite with the one stop shopping concept in mind to integrate all facets of managing the needs of government. Their goal was to provide a single solution from a single vendor for all government information technology requirements. Hansen believes they have accomplished that goal by introducing the software called "Enterprise Product Suite." This software is comprised of numerous modules offering a pick and choose type customer product selection.

The Hansen software "Enterprise Product Suite" offers five modules to support government operations. These modules include Citizen Relation Management, Financial Accounting, Revenue Accounting, Business Intelligence, and Operations Management. See Appendix 1 for a complete list of subcategories for these modules.

This paper will focus primarily on the Operations Management module because it most closely represents what a Navy Public Works division would encounter. There are seventeen sub-modules in the Operations Management module which are listed and described in the next section. The primary sub-modules addressed in this paper (within Operations Management) will be Work Order Management and Materials Management. These sub-modules were chosen because financial and material management issues are the major concern in a Navy public works environment.

### 1.2 Objectives

The primary objective of this paper is to provide a thorough study and evaluation of the Hansen Information Technologies Companies' software. The Public Works divisions that are located on almost every U.S. Navy base have Public Works offices which are set-up similar to any County or City Public Works Division.

A secondary objective of this paper is to introduce the Navy to the Hansen “Enterprise Application Suite” as a potential means to increasing the efficiency of work order management and warehouse inventory control procedures for the Navy. The Navy can benefit from this software because it provides the control and accountability needed in a Public Works Division. Using Hansen software will eliminate duplicate effort when processing work orders and it will eliminate lost inventory. These are benefits sought in Naval Public Works.

The City of Raleigh Public Works division has been chosen as a model to demonstrate the usability of the “Hansen Application Suite.” The Raleigh Water Warehouse division has achieved tremendous improvements in work order management and inventory control by using this software. These improvements have saved taxpayers thousands of dollars and reduced manpower requirements in the warehouse.

## **2.0 The Hansen Software Enterprise Product Suite (EPS)**

This EPS software applications is designed to assist public sector organizations in performing all of the major business functions typically encountered during day to day operations. The following sections further describe these and present them as five major modules. Appendix 1 summarizes the modules and sub-modules in the entire suite.

### **2.1 Citizen Relations Management (CRM)**

The Citizen Relations Management module automates the process of generating documents that deal with internal and external customers from a customer service point of view. It consists of the following sub-modules.

- Code enforcement
- Complaints
- Dispatching
- Knowledge Base
- Service Requests

### **2.2 Financial Accounting**

The Financial Accounting applications provide integrated, flexible full government accounting, payroll, and human resources functionality with reporting solutions in support of a client’s accounting and operational requirements. The following list identifies the sub-modules that are available in this module.

- Accounts Payable
- Accounts Receivable
- Encumbrance Accounting
- Fund Accounting
- Fixed Asset Management
- Grants Management
- Inventory Control

### 2.3 Revenue Management

The Revenue Management module tracks all revenue generating processes encountered by a local or state government. The sub-modules consist of the following.

- Assessments
- Fines
- Grants
- Property Taxes
- Permits and Licensing
- Special Fees and Utility Billing

### 2.4 Business Intelligence

The Business Intelligence module provides the metrics needed to analyze a process to gauge whether a resource is being utilized in the most efficient way possible. This module provides various reports to be used at all levels of management. The business intelligence functionality is accomplished by the sub-modules which follow.

- Business Scorecards
- Performance Metrics \*

### 2.5 Operations Management

The purpose of the Operations Management module is to deal directly with day to day activities and transactions of public sector organizations. The following is a list of the sub-modules related to operations management.

- Building Permits
- Budget Management
- Business Licensing
- Code Enforcement
- Conditions Assessment
- Fleet Management
- Material Management \*
- Operations & Maintenance
- Parks and Recreations
- Public Works
- Sanitary Sewer Management \*
- Storm Water Management \*
- Transportation
- Timesheet Reporting \*
- Treatment Plant Maintenance
- Water Distribution Management \*
- Work Order Management \*

### 2.5.1 *Operations Management Sub-Modules Used in the RWW*

The asterisks that follow the sub-modules shown in the previous two subsections denote which modules the Raleigh Water Warehouse has implemented. A brief description is now given for these modules. A description of the warehouse itself is given in Section 4.0.

**Material Management** – This module is used primarily for warehouse and mobile inventory control. Hansen software provides the ability to attach inventory to a work order for tracking and control purposes. The RWW and the mini warehouses use the Material Management sub module for inventory control by creating a database of all material used in the warehouse. The mine warehouses are satellite warehouses located in Garner and Rolesville to offer water and sewer services to those areas. These mini warehouses are set up identically to the main warehouse. When material is check out or returned, the inventory data base is updated automatically when the work order is completed. Each time a work order is closed out the material is updated in the database to indicate, part number, amount available, and reordering levels. It is the work order that triggers the database update process.

There are two mini warehouses located in Garner and Rolsville due the expansion of water and sewer services in the surrounding areas. As the RWW expands their area of operation there will be a need for more mini warehouses. Each mini warehouse is treated individually for material accountability. That is the mini warehouses order and maintain material for their area of responsibility. Each truck assigned to a mini warehouse becomes the responsibility of that warehouse. All material inventories are controlled and maintained by the mini warehouse. The RWW oversees the ordering process of the mini warehouses but only for information purposes and audit control. The Hansen inventory control system handles all material needs through the use of cataloging, security, ordering, purchase ordering, tracking, transactions, repairs, bill of materials, and reporting.

**Sanitary Sewer Management** – This module tracks all sewer mains in the Raleigh area. Approximately 2200 of miles of sewer main can be identified by age, location, service condition and requirements. This system completely manages the sanitary sewer system network and includes manholes as well as force main and non force main systems.

**Storm Water Management** – The Hansen Storm Water Management module aides in complying with all U.S. EPA regulations, and also justifies to appointed officials of how periods of excessive rainfall are handled. Hansen has helped the RWW accomplish this task by creating a database of all catch basins, drainage inlets, open ditches, channels, and mains. When warehouse personnel create a service request or a work order, an asset list of the above mentioned items are displayed on the computer. This allows easy identification of all the water or sewer assets located in the work area. The storm water module consolidates all NPDES (National Pollutant Discharge Elimination System) information into a single database for instant access to the information located on the computer. This keeps the managers informed so that they can be sure to satisfy the rules and regulations for discharging pollutants into streams, lake, rivers and estuaries.

Timesheet Reporting – This module tracks all employee time sheets through the Work Order Management module. In the RWW timesheet reporting is done automatically when service requests and work orders are generated and completed. This automation process eliminates the manual reporting of employee time records.

Water Distribution Management – This module manages all pressurized potable water services for the Raleigh area. The Raleigh Water Warehouse uses it to identify lines, meter locations, valves, backflows preventors, intersections, and shutoffs for customers so that they may receive the best possible service. It also identifies flushing schedules for the water lines and meter changing schedules.

Work Order Management – The work flow management system is a module that aides a user in understanding the work flow process. This module provides the ability to follow the flow of reviews, approvals, and other requirements as they are needed to be seen by various participants in the process. The RWW uses the Work Order Management module to implement its unique the work order process. The screens available to the user present a systematic display of the sequence of operations and updating work orders that comprise the work flow process. The screens available by Hansen are set up in a tab format to pick and choose the correct ones to perform the desired operation for any business flow situation. These screens can be seen in Section 4.4. RWW personnel have a step by step manual to aide them in this process. Hansen developed the work order management procedure manual and IT Department of the City of Raleigh developed the inventory control manual. Appendices 9.6 and 9.7 present text of these manuals. The actual work orders and service orders can be seen in Appendices 9.10 and 9.11. These documents are accompanied by their respective screen shots to show the reader what the work order and service order actually look like. There are two areas specifically addressed by Hansen in this module. These are work notices and extra customer service.

- *Work notices* can be inserted during the maintenance process as part of the work request process. Work notices reflect additional requirements needed during the planning process. Hansen uses the example of additional information needed prior to a road closing. The system may require a review of the work activities as they relate to the closure or they may identify alternate routes needed for traffic.
- *Customer service* is streamlined in the Hansen module to record customer service problem calls, dispatching orders to field personnel, and field inspections and their costs. This tool allows a range of operations to be tracked from the initial customer calls to the personnel going out in the field to respond to the problems identified by the call.

Performance Metrics – Hansen’s performance reporting is an important part of the measure of success of the software installation. With Hansen reporting tools the organization or agency can be more efficient with time. This software offers a large selection of standard report forms. Using these, lists can be generated that include basic identification information as well as inspection or work histories. Professional reports, graphs, and charts can be produced with ease. The reporting system is user friendly and doesn’t require a through

knowledge of database systems. It does, however, effectively package and present data to key personnel.

The RWW uses the Performance Metrics module to supply supervisors with information that enables them to make informed decisions on work histories. This, in turn, enables them to adjust work schedules for better productivity. Professional reports can be generated with graphs and charts for updates and for meetings with presentations to upper management personnel.

## 2.6 Hansen Mobile Solutions

Hansen Mobile Solutions (HMS) provides a fully functional, field automation solution. HMS enhances the capabilities of the Hansen “enterprise product suite” to provide scalable, efficient, and cost effective solutions for improving business processes in the field. This is done by using pocket computers or laptop computers installed in vehicles to transmit data in a duplex manner back to the main office. This can be accomplished a number of ways, but the most frequent are wireless communications using transmitters or a computer network system. With the flexibility of Hansen’s field automation, one can collect data and update records without interruption even when roaming in and out of service range.

The RWW uses the HMS system to generate and complete work orders in the field electronically. This is accomplished by the field personnel using laptop computers or PDAs in the service vehicles to transmit and receive real time information. The RWW uses a third party vendor to provide wireless communications between the field and the warehouse. This vendor could be anyone who offers cellular and data communications wirelessly and a broadband width to transfer map data. The RWW uses the third party software called Sprint Net Motion. This software uses pre-existing cell phone towers located throughout the Raleigh area for duplex data transmissions between the field and RWW. The area of coverage is excellent and with no dead areas encounter by the RWW. But on occasion, when dead areas are encountered and the signal is lost, the data will be downloaded immediately back to the warehouse when the signal is reestablished.

The HMS system benefits include:

- Field crew personnel and inspectors can receive daily assignments without visiting the office – often increasing work production. The RWW field personnel will receive a full day’s work when they turn on their computers at the beginning of their shift. The work downloaded to the laptop computer will be in the form of work orders. This enables them to receive their assignments from the warehouse more efficiently since the material is prepared the day before and is available for pickup at the start of the employee’s shift. Employees do not have to come back to the shop for additional work or emergencies since this information can be transmitted to them in real time. The employees are able to accomplish more work because there is less time wasted at the warehouse.
- Field crew personnel can directly access supporting information from their Hansen database. The RWW personnel have access to the main database for finding supporting information such as addresses, maps, and assignments. Since the RWW

personnel can access this information directly and remotely, it provides more time to accomplish the work and requires less time gathering information from other sources.

- Finished work descriptions can be transmitted directly back to the database for record keeping and archiving. When the work is received, the Field service personnel finish the work by completing the work order and adding comments or pictures, if necessary, on the laptop. The information is transmitted by means of HMS to a cell tower by hitting a send button located on the keyboard of the laptop.
- New assignments or emergencies can be transmitted immediately to field personnel as they are detected. This is a big advantage offered by the Hansen software. When emergencies or additional work notifications are received by warehouse personnel they can create a work order, immediately locate the nearest field service vehicle using GPS, and transmit the work order to that vehicle and area. The advantages of being able to have this type of system in place are numerous and include quicker response times to an emergency, less maintenance of field service vehicles because fewer miles will have to be traveled, and higher work production.
- Supervisors have the ability to adjust work schedules as they deem necessary. The supervisors in the RWW can adjust work schedules to ensure that everyone is doing their fair share of work. At any time, the supervisors can locate and determine if a field service truck is having difficulty accomplishing their assignments. The supervisors can use HMS to look up any field personnel's assignments and determine if they can finish that day's work. If the supervisor determines the assignments can't be finished, then the supervisor has the option of moving the assignments from one truck to another. This will prevent overtime situations because the supervisors are able to monitor field production by their personnel and shift work among crews during the course of the day to even the workload.

The HMS system provides two primary field applications: "Permit Inspection/Code Enforcement" and "Work Management."

- Permit Inspection and Code Enforcement enables the user to:
  - Download pending inspections by address or parcel
  - Submit violations
  - Check ordinances
  - View premise history
  - Build case log
  - Verify existing permits
  - Reassign personnel in the field
  - Order daily work log/route
  - Print in the field
- Work Management enables the user to:
  - Document completed work

- Record costs and results of work
- Check other pending work and inspections for an asset
- Better manage inventory for real time cost savings

With the flexibility of Hansen HMS applications, working in remote areas without interruption is possible by using the wireless data services. Once the field worker is in range of communications the data is immediately downloaded to the Hansen database system to prevent loss of data. This download is automatically achieved through the use of a batch files and occurs instantaneously with the use of third party vendor software.

### **3.0 Case Studies on the use of Hansen Software**

The nine case studies listed below are actual case studies done by Hansen over the course of fifteen years. The case studies were found on the Hansen website provided in the reference section of this paper [1]. Their purpose is to show the effectiveness of the Hansen software. The majority of the case studies presented below use the Operations Management module.

In reviewing the following case studies it became clear that overwhelmingly the cities, counties, and towns therein described are very satisfied with the various benefits of cost, time, operation, and the ability of using the software right off the shelf. It also became apparent through the case studies that Hansen offered exceptional customer service when working with various local and state governments.

In Section 4, this report will demonstrate similar advantages in the RWW, which is our own intensively investigated case study. From there we postulate that similar results and benefits will be found in Section 5 where the case will be made for use of the software by the Navy.

#### **3.1 Buffalo, NY**

##### **3.1.1 *Problem***

In 1998 the City of Buffalo's Department of Permit and Inspection Services adopted several computer software programs that were being maintained by an in house software team. With the approach of Y2K, and with their software programs not being compliant, the City had to find an integrated network system that met Y2K requirements. There old system was costly in terms of repair and time.

The new system they wanted had to remove processes and procedures that were redundant. It would also have to support current business practices and be able to view different aspects of the City's properties.

##### **3.1.2 *Solution***

The City of Buffalo adopted the Hansen software to alleviate their problems. In particular, the city used Hansen software used the Land Management software which was specifically developed for the city's Department of Permit and Inspection Services.

The City is using the Hansen system for the permitting, housing inspections, housing courts, plans review, and zoning. The Housing Court Department has jurisdiction of the use of any real property and activities that affect the health, welfare, and safety of any resident, occupant of the general public and which is subject to regulation by local cities and towns under the state building code. The treasury, real estate, and collections department are using the Hansen software on a daily basis in addition to the Permit and Inspections Services department according to the case study.

The software has helped City of Buffalo departments communicate better because everyone is on the same system and speaking the same language. Permits are now being issued in a couple of seconds instead of days.

### 3.1.3 *Results*

The Hansen software has provided many platforms for the City to speed up and streamline the growing need for their online processes. According to the case study after six months of application their employees were complaint free, and now the City is looking at other online Hansen products to enhance their efficiency further in other areas.

## 3.2 California Department of Transportation

### 3.2.1 *Problem*

The California Transportation Department (CALTRANS) is responsible for the maintenance of the roads in California. CALTRANS stated in the case study there are so many roads in California they would wrap around the world twice.

Their old computer system was a text based system, with limited capabilities. Information would be passed through several different locations and updated on a monthly basis. This posed two especially serious problems. The first was lost information and the second was that managers were receiving time sensitive information late.

### 3.2.2 *Solution*

Hansen software won the government contract and proposed the use of their plants and roadway modules. Using these modules would enable CATRANS to take on the massive job of asset tracking and maintenance.

CALTRANS would have 1,600 users on the system with an estimated 600 to 700 concurrent users. There would also be approximately 650 field crews using the system. These field areas maintain assets such as road signs, signal lights, and roadside rest stops, and of course, the roads themselves.

### 3.2.3 *Results*

The Hansen software modules used by CALTRANS were initially used as purchased. Later they were reconfigured to meet the Department's specific needs. CALTRANS is excited about the new software that is allowing real time updates with other divisions as well as the

field personnel. Since the introduction of the new software and Hansen's customer service group, information queries can be answered and real time data can be updated instantly.

### 3.3 Columbia, MO

#### 3.3.1 *Problem*

In the early 1990's the City of Columbia's Public Works Department noticed infrastructure problems that were garnering national attention. They decided to use a computer network system for resource management and infrastructure to address these problems. The street management division decided to purchase a computer and software to aide them with this task. It didn't take them long to realize they were going to need more powerful software than that initially purchased. They needed to inventory their streets and to be able to track costs for paving and seal coating. It seemed logical to City management that it was important to integrate infrastructure management system with a pavement management system.

#### 3.3.2 *Solution*

In 1994 the City of Columbia purchased their first software from Hansen which was a Maintenance Management product. The City of Columbia's Public Works Division, along with the aid of Hansen personnel, updated their old tracking system to a new modern database with newly added codes. In 1998 they upgraded to version 7 of Hansen software and continued increasing the size of their database with real time information.

#### 3.3.3 *Results*

As a result of the Hansen software solution, reports and cost analysis that normally took days or sometime weeks to create now only take a few minutes. The City stated in the case study that the new software has helped the City from a cost saving standpoint as well. The City has implemented the system for the operations of the street, storm water, traffic divisions, and maintenance.

### 3.4 Fayetteville, AR

#### 3.4.1 *Problem*

The city of Fayetteville with its 58,000 citizens was looking for a single entry point to access commonly used data. The city wanted to standardize technology as well as have a strategic asset for the city. They were looking for a system that could handle the robust needs of Fayetteville now and in the future.

#### 3.4.2 *Solution*

In February of 2002 the city decided to purchase the Hansen software for permitting, public works, and call center solutions to manage its assets, inspections, work orders, water, sewer, plant, street, and customer service activities. The Hansen software used by the city tracks 4,500 valves, 1,000 miles of pipe, 11,000 manholes, and 300 mile of roads. The city issues hundreds of building permits each year, receives over 30,000 calls a year, and performs

27,000 inspections. All of these are recorded, maintained, managed, responded to, and reported on using the Hansen software.

The city was able to replace several non-integrated systems with the Hansen software and can now track work orders, equipment, and inventory items. It has also been able to increase efficiency with both the internal and external customers.

One aspect of the software with which the City was most pleased was the way that Hansen Software could be used “right out of the box.” Furthermore it integrates with other software such as Microsoft Office, the City’s own award winning Geographic Information System (GIS) database, and telecommunications systems.

### 3.4.3 *Result*

The new system will give the City of Fayetteville and its 200 plus users an immediate interface to track work orders and manage customer calls, and track them to closeout. As a result of using the software the City’s internal communications improved and helped them with external communications with their customers.

## 3.5 Ft. Lauderdale, FL

### 3.5.1 *Problem*

In 1996 the City’s underground sewer and water lines, that support the 300,000 people living in Ft. Lauderdale, was in need of reengineering due to the age of the infrastructure and number of breaks that had been occurring.

### 3.5.2 *Solution*

The city adopted the Hansen software to help aid in this task. Initially the City implemented the maintenance software and then in 1999 they progressively added new modules to increase the efficiency of City operations. The “Enterprise Application Suite” was chosen and the Citizens Relations and Operations Management modules were used to help the City with their aging computer infrastructure. They also purchased other enhancements to allow the city to attach graphics, maps, and documents to other companies’ software. This software consisted of various other manufacture databases that the City was using prior to Hansen. Instead of the City having to rebuild the databases, Hansen adapted their software to work with the City’s preexisting software.

The City of Ft. Lauderdale stated that it looked to Hansen for “excellent software and technical advice,” further indicating that Hansen helped the City in upgrading servers when they switched to different versions of the Hansen software and relied heavily of Hansen to download data to the new server. The City actually shut down their servers for a weekend turnover and was back on line Monday morning thanks to Hansen’s outstanding customer service.

### 3.5.3 *Results*

Since the implementation of the Hansen software for the Public Works Department, the City Manager's Office has ordered other modules from Hansen. These will allow enhanced cooperation between departments. The Mayor of Ft. Lauderdale is exploring other modules to help his city improve efficiency. Some of these upgrades include GIS and wireless access to field staff so the main office can communicate through wireless computers for live updating.

## 3.6 Hamilton, Ontario, Canada

### 3.6.1 *Problem*

Ontario Canada's City of Hamilton in 2001 literally increased its population by 100,000 overnight. The government was merging smaller cities with larger ones. This posed a serious problem to Hamilton because its water and sewer distribution systems were unable to accommodate the merger of the cities.

### 3.6.2 *Solution*

The City of Hamilton had been partnering with Hansen since 1998, so the transition to the newer version of its software was not as dramatic. In 1994 the City was using GIS mapping software for mapping all of its water and waste water infrastructure. The City also stated "we don't do any customizing of the Hansen application. We use it straight out of the box." According to the City of Hamilton this was one of the selling points for choosing the Hansen software in the first place.

The City of Hamilton purchased the Customer Relations and Operations Management modules for their field service operations. During their day to day work, City inspectors carry laptops in the field and update information automatically in the database. Doing so bypasses the physical process of transferring paperwork from the field to the home office. The City hopes to try a pilot program using wireless technologies in the field to make the transfer of information from the field even easier. The Department is also involved in establishing a new, centralized call center because of the consolidation of Cities. The consolidation of Cities will reduce the number of call centers that are presently being used. This will provide the customers with a single point of contact to address their concerns about public utilities and increase customer satisfaction.

### 3.6.3 *Results*

Hansen software now helps the City of Hamilton track 1,118 miles of water mains and 1,376 miles of sewer mains. According to the City "the Hansen software has taken the mystery out of maintaining aboveground and underground equipment." All inspections are scheduled now and this is something the city never used to do. The city believes this is good for the homeowner and that it increases customer satisfaction.

### 3.7 Las Vegas, NV

#### 3.7.1 *Problem*

Las Vegas is experiencing enormous growth. It is estimated that 3,000 to 5,000 people move there every month. The City's manager's office was faced with 14 different departments using 14 different IT systems that had a minimal relationship with each other. The City Manager knew they needed a more integrated approach to their operations.

#### 3.7.2 *Solution*

The City investigated the Hansen software system and started working with Hansen personnel to develop a solution for integrating the Department's IT functions. The City agreed, after attending several meetings, that the Hansen software system could accommodate the city. Las Vegas made a "landmark" decision and acquired an enterprise license from Hansen. Las Vegas was the first city to purchase an enterprise license. Doing so entitled the city the use of all Hansen software modules. The software modules allow integration through all departments. The Hansen software enabled the city to meet its technology requirements as well as to increase interdepartmental relations. These were minimal before implementation of the software.

#### 3.7.3 *Results*

Since the integration of the Hansen software the City has move to the forefront in municipal government management according to the case study. The City now processes over 1,100 work orders a month without using paper to do so. The City spends approximately 2 to 3 million dollars a year on IT projects. This was the same amount they were spending before, but now they have many other ancillary benefits that have freed up personnel to do other tasks.

According to Joe Marcella, Director of the Information Technology Department, "Not only has the public-private partnership resulted in observable efficiencies, it has facilitated ongoing funding of IT projects." He also states that it helped them create a "community" culture where the divisions trust the IT manager to work in their best interest.

### 3.7 New Castle County, DE

#### 3.8.1 *Problem*

In 1990 New Castle County started an electronic transformation. The County had an in-house IT staff performing all of the management of their software. This became time consuming and costly. In 1994 there were over 30 people maintaining and writing applications for the County. This became unmanageable quickly according to the case study. It didn't take long for the county to realize they needed a commercial software package so they could build an infrastructure around the applications to support them. The County's 12 year old IBM mainframe system had to be replaced along with its tax, permitting, financial, public works, and transportation systems. This included replacing several hundred computers, all of the wiring, and the servers.

### 3.8.2 *Solution*

After an extensive search the County decided to purchase the Hansen system applications. The case study stated “They had a clear understanding of the business and what needed to be done.” With the Hansen system several county offices were able to restructure their business processes and increase efficiency. It used to take weeks to approve a permit, a process that can now be done online almost instantly.

### 3.8.3 *Results*

With the new system in place the City of New Castle Technology Department has taken on a business consulting role for the county. New Castle is a success story according to the case study and reflects on Hansen by saying “We think it’s a great company to work with and they take great pride in writing software. I feel there is no company that has produced more reliable products.” The above was quoted by Mr. Tim Westbrook, Information Systems manager.

## 3.9 Tulsa, OK

### 3.9.1 *Problem*

Tulsa is the second largest city in Oklahoma with a population of approximately 380,000. The City went through a major change of government from a Mayor-Commission form of government to a Mayor with a strong City Council. This set the stage for the City Council to develop an automated approach to manage service requests. They first obtained mainframe software that another city was using about 90 miles away. This software adequately met their needs for a short while, but after the end of the mainframe era the software was no longer supported. The City was forced to seek alternative automation software.

### 3.9.2 *Solution*

In 1995 the City chose Hansen’s Citizen Relations Management module to help them with their operations. The City found the Hansen software to be user friendly and to meet almost all of their needs. The Public Works Department was particularly looking for software to aide them in the areas of building permits and contractor licensing. Mr VanLandinham, assistant to the Mayor states “They met our requirements well and almost identically replaced what we had.” With the new customization all jobs are logged and track to ensure timely response to the customer.

### 3.9.3 *Results*

The City today has all of its service requests routed through the Mayor’s Action Center. They receive 500 calls a day of which about one third end up being service requests. These are all processed using the Hansen software. The remainder of the calls are for information purposes, according to Mr Vanlandinham. He goes on further to say that “This has enhanced government in the eyes of citizens.” The City receives very few complaints from citizens anymore. Mr Vanlandinham hopes to keep a good relationship with Hansen since the City is moving more into the e-government realm.

### 3.10 Summary

Below is an overall table showing the modules used by the, Cities, Counties and Towns in the 9 case studies described in Sections 3.1 to 3.9. Also included, for comparison, is data from the City of Raleigh.

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From the information provided in the table above, it can be seen that all of the case studies, including Raleigh, purchased the Citizen Relations Management and the Operations Management modules. During the investigation of the case studies and the RWW the Citizen Relations Management module was made one focal point of study because of its customer service applications. The Operations Management module was made another focal point because of all of the sub-modules offered to help maintain and track work orders and inventory.

A second table is provided on the next page to show the sub-modules used by the case studies as well as the RWW.

#### **Application Areas Addressed by Each Case Study**

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In the above table it can be seen the Hansen software addresses a wide variety of applications areas through the use of its sub-modules. The majority of the case studies use the Citizen Relation and Operation Management modules. The Citizen Relation module focused mainly on relations with the internal as well as external customers of the various Cities, Counties, and Towns. The objective of the Citizen Relation module is to track service requests and service calls from inception to completion. The Operations Management module provided all the necessary management systems for work order management, water, storm water, and waste water distribution systems. Some of the less frequently used modules included the Business Intelligence, Revenue Management, and Financial Accounting. From my research, these modules are used less because other departments either had their own software systems or just didn't see the need for acquiring additional software. In almost all the cases, it was the Public Works Department that decided to purchase the Hansen software. Most of the case studies, with the exception of Las Vegas, started with only a few applications to determine if the software was going to meet their requirements. Once the software proved to meet their requirements, then they were willing to purchase other modules of the Hansen Enterprise Production Suit. All of the cases investigated herein resulted in the government pursuing the possibility of purchasing other software modules from Hansen.

#### **4.0 Raleigh Water Warehouse**

The Raleigh Water Warehouse (RWW) is located behind the Towers Shopping Center on Lake Woodard drive, east of the City of Raleigh and minutes from downtown. The RWW is responsible for supporting the construction, maintenance and meter/warehouse divisions and

is responsible for stocking all material needed for the sewer and water distributions systems. The warehouse has over \$2.6 million of materials in inventory at all times.

The warehouse maintains and repairs approximately 2200 miles of water and approximately the same amount in sewer mains. The warehouse has recently expanded its operations to Garner and Rolesville, NC. The “mini warehouses” discussed in Section 2 are located in these Cities. The meter division maintains and replaces hundreds of meters a month and records thousands of meter readings daily.

The RWW used the antiquated database software called Legacy before Hansen. The Legacy system was appropriate for awhile but as the City began to expand and their operations continued to grow it was becoming apparent to warehouse management that their old computer systems were not able to handle the expansion.

#### 4.1 The Need for Automation

The RWW started investigating automation software in 1993 to integrate their various databases. They hired a consulting firm CMH2 Hill-Raleigh to assist them in determining which software vendor would best suit their needs. In February of 2001 CMH2-Hill prepared A Needs Assessment Report for an Inventory work Order System (Appendix 9.2.) The Needs Assessment Report documented the City’s requirements for an automated work order management system. The City formed a project management team, consisting of nine representatives from various divisions of the City, was assembled to evaluate the prospective vendors.

Through the consulting firm process the City developed a set of questions to ask each vendor. The questions consisted of several different categories to include system requirements, technical requirements, and implementation (Appendix 9.3, Sections 3, 4, 5, and 6 of the RFP.) They sent the questions out in advance so that vendors could prepare their answers in a timely manner. When the vendors returned their response they were evaluated and their five most responsive vendors, based on their answers, were selected. The City requested that these vendors travel to Raleigh and present their product. Each one was carefully evaluated during the visit and graded.

When all the scores were added the Hansen Software group scored highly and was selected. According to then Assistant Project Manger Charles Langston, “Hansen had everything we wanted and then some.” He also stated that Hansen software was selected because it best suited the needs of the City. In fact, it was even more expensive then some of the other vendors. Price wasn’t the primary concern, however, functionality was, according to Mr. Langston.

#### 4.2 Material Purchasing

The RWW stocks one of everything needed for inventory control purposes. The warehouse has a 60% turnover of inventory every six months, and 10% of inventory that never turns over. The material that never turns over includes items that would be used only in extreme emergencies, such as water mains that are 50” or larger.

Materials ordered by the warehouse are determined by the price of the item. The price amount determines which purchasing process the RWW will use.

- Material costs up to \$10,000 can be attained by an informal bid process. That is the warehouse supervisor can purchase these items as he deems necessary.
- Material costs over \$10,000, on the other hand, must be sent to the City purchasing office in downtown Raleigh to be subject to a formal bid process. This process consists of a request for proposals (RFP) and a response from at least three vendors before the City can purchase the items.

#### 4.3 Material Accountability

Employees are currently responsible for material that is issued to them. Inventories are automatically updated in the Hansen database for each truck as material is checked out of the warehouse. There are periodic spot-checks of the trucks to ensure material accountability. All material is accounted for on each truck; truck-to-truck transfers do occur but employees are careful to update inventories regularly. Surplus materials are returned to the warehouse and are updated in the main database system. This takes the material out of inventory on the truck. Once the HMS is fully functional the employees will not be required to fill paperwork out manually; the HMS will automatically update the system once the work order is closed out in the field.

In the event of an emergency, there is an emergency locker located in the warehouse for personnel to acquire response materials after working hours. When material is taken from this locker the personnel responsible for doing so will turn in a written work order identifying the items taken. This work order will be processed the next business day. When the clerk receives the work order it will be closed out and the inventory database is updated automatically, thus accounting for the use of emerging materials.

Warehouse personnel are held personally responsible for materials that are issued to them. Items such as personal protective equipment (PPE) and tools can be charged to the employee if they are lost. In order for an employee to get a new tool or PPE, the used equipment or tool must be returned and new items are then issued without charge. The warehouse spends approximately \$10,000 on tools and PPE, which is a savings of \$50,000 from spending in previous years.

The warehouse stores and identifies material with a labeling system. The labeling system identifies the row and bin number where the material is located. This labeling system is used in the Hansen database to identify and track low stocked items. The material is scanned in by the use of barcodes and automatically inputted in the database system.

The warehouse has been adding additional automated systems to increase their material accountability. The warehouse purchased two automated material 48 tray carousels that allow easy access and accountability for bulk materials. This computer system generates inventory requests that are automatically updated through the Hansen software.

The warehouse is in the process of expanding their storage yard to keep up with the expanding requirements of the City. The RWW storage yard identifies material by using placards as a labeling system. Material is accounted for in the yard the same way it is accounted for in the warehouse. There are a limited number of people who are authorized to work in the warehouse and access material's there. This is one way the warehouse maintains accountability of warehouse and yard inventory.

#### 4.4 Work Order Management

Charles Langston is not only the project manager for the Hansen software but he is also the Superintendent for the sewer and water divisions, which consist of a staff of five supervisors and 70-75 employees. This number of employees dictates a formal work management approach. The RWW was the first division in the City to implement the work order management system and through the years it has become an efficient process. At one time, there were clerks entering the same data twice to get the information into another database so that others could use it. The duplication of work was tremendous and was not efficient. The employees in the field would sometimes permit work orders to remain in their trucks for days before submitting them to the clerk. This caused problems with inventory accountability in the warehouse. It also severely limited the ability of the Department to close out work orders. The Citizen Relations Management module, along with the Work Order Management Sub-module, makes this process more streamlined and easier to manage.

The Work Order Management System is controlled by the Work Order Management sub module in the Operations Management module of the Hansen software. The system is designed to provide a user friendly interface when initiating a customer service request or work order. The Work Order Management System is designed to locate the physical address of the customer request by means of GIS and an address look up feature. Once the area is located another section will identify all material located in that area and identify it with name and nomenclature. The user will then assign a vehicle to the service request and issue the work order for further investigation.

The following discussion relates to Figure 1. The discussion itself is a textual description of the items shown in the figure. Each component of the figure is numbered and it is this numbering that is used in the text to direct the reader to the location being discussed. Furthermore, most boxes are also illustrated by another figure that shows the actual screen that a Hansen software user would see or encounter when performing that operation. These are all placed in appendix 9.4.

Figure 4, is a logic chart showing how one would log into the system to create a customer service request and then, if needed, create a work order.

A service request is a record of a call by a customer that notifies the RWW of a potential problem or an emergency with either the water or sewer systems. The service request necessitates a field investigation of the problem. An employee must visit the location in question and determine if the problem can be fixed at that time or if the employee needs to initiate a work order.

A work order is a repair to be made at a specific time. Usually it is a scheduled repair, but in the event of an emergency, the work order will be prepared at the location of the incident. If it is not an emergency the employee will have the necessary material with him to accomplish the job. There could be special instructions attached to the work order if any were generated by the service request.

When a customer calls the RWW a customer service order is generated and the following information is collected.

- Name and address of person calling the customer service request
- Concerns of the customer or the problems identified are entered
- Any other pertinent information that would be used to help with the customer service request is gathered. Pertinent information would include special instructions to the service employee before proceeding to the address in question.

At the time of the customer call the clerk will bring up the Hansen Version 7.7 software system. (box 1 and Appendix 9.4.1)

- The clerk will sign on and enter an identification and password (box 2 and Appendix 9.4.1)
- The clerk enters the information collected above, and at this point has two options. (box 3 and Appendix 9.4.2 and 9.4.3)
  - A service order already exists (box 4 and Appendix 9.4.2)
  - A service order doesn't exist (box 5 and Appendix 9.4.2)

If a customer service order already exists in the system for a particular address then the new information is entered and the order is updated to include both customers' calls. When the address is entered into the system a GIS screen pops up to aid the person entering the information. If the address is found in the system an additional window pops up to identify all the assets for that particular location. Once all the information is entered a customer service order is generated and issued to a vehicle and to the individual or crew assigned to that vehicle. If the service request is an emergency the employee is notified immediately by telephone or by computer to expedite the investigation.

If it is determined that a work order should be generated the employee entering the data will generate a work order with all pertinent information entered (box 6 and Appendix 9.4.4.)

When responding to a customer service request the RWW employee may determine if an emergency or non emergency exists when conducting the investigation. If it is an emergency the employee will notify the appropriate personnel to immediately make the situation safe and repair. If it is not an emergency the employee will determine if the problem can be fixed at that time. If not, then a work order is generated. A work order requires additional time and resources. It is usually a scheduled appointment included in the employee's daily work to be accomplished that day.

The Hansen software Version 7.7 is up and running and working well for the RWW, it has been on line since April 2004. According to Mr. Langston the Hansen software has offered many advantages over the way the RWW used to do business. All work orders are now closed out in fewer than two days and there is no duplication of work. All inventories are updated automatically when a work order is closed out. Reports can be generated for low stock or out of stock ordering.

The warehouse supervisor will generate a reorder level report from the Hansen software (Appendix 9.5) to indicate material that needs to be reordered. This is a completely manual process. When the supervisor receives the report he manually verifies the material that needs to be reordered. The reorder level report will give the following information. The warehouse supervisor will generate this report approximately once every two weeks or sooner if he notices or knows that something needs to be reordered.

- Stock area
- Part description
- Part #
- Stock location
- On hand
- Reorder level
- Reorder quantity

The Hansen software does an adequate job in tracking material that is used from the warehouse, but lacks the ability to automatically notify the supervisor of low quantities. The supervisor must manually verify the reorder level report before ordering material for the warehouse. This takes a considerable amount of time and effort to accomplish and prevents the warehouse supervisor from doing other work. The RWW has been notified of this discrepancy and is considering how to rectify it.

#### 4.5 Inventory Control

Hansen Software has given the RWW the ability to track moving inventory. This was a difficult problem for the RWW when trying to account for the entire inventory of the warehouse and the trucks. As discussed in Section 2, a database of all material used in the warehouse is created for material control and tracking. When material is check out or returned it is updated automatically by closing out the work order. Each time a work order is closed out the material is updated in the database to indicate, part number, amount available, and reordering levels. There are two mini warehouses located in Garner and Rolesville that were created to handle due the expansion of water and sewer services by the Utility Department. Each mini warehouse is treated individually for material accountability. That is, the mini warehouses order and maintain material for their area of responsibility. As the RWW expands their area of operation more mini warehouses are expected to become available. Each truck that is assigned to the mini warehouse becomes the responsibility of that warehouse. All material inventories are controlled and maintained by the mini warehouse. The mini warehouse will operate identically like the main warehouse with their own databases through the use of the Hansen software. Prior to the use of the Hansen software, the field trucks were showing an inventory value of up to \$250,000 per vehicle. It

was often the case that inventory reports were off by as much as 50% for inventory control assessment.

The Hansen software has changed all of this. Now field trucks have approximately \$60,000 of inventory and employees are held accountable for their stock. This eliminates unnecessary inventory on the trucks and enables better physical control of materials. The new system has become especially useful during audits. Since inventory is now more correctly accounted for, the audits are more accurate. The Local Government Commission (LGC), who oversees all financial matters for the City of Raleigh, will allow up to 2% error in the auditing process. If the RWW goes over that percentage they will allow them to write off the excess amount but only after providing good justification and a plan of action to prevent it from happening again. However, if enough money is written off this could affect the AAA rating the City has with banks, and ultimately, it would increase their interest rates. This would eventually end up costing tax payers more for city water and sewer usage.

All material is tracked in and out of the main warehouse. There are numerous areas throughout the City where material is located in smaller warehouses called “mini warehouses” (Section 4.4) to help with the expanding areas of the City and meet the responsibility of the City to those areas. Crew trucks are also considered to be “mini warehouses” with inventory checked in and out of the main warehouse or the “mini warehouses” located throughout the area. These trucks carry large amounts of inventory and are responsible for their own inventory. As inventory is used it is reported to the main warehouse by updating the inventory through the Hansen database system by closing work orders or purchases requests. This is done manually by warehouse personnel now, but when HMS comes on line everything will be done automatically through data communications provided by a third party vendor using the city’s cell phone towers. The inventory control module offers cataloging, security, ordering, PO sending, transactions, repairs, bill of materials, and reporting.

- The warehouse inventory data was easily integrated into the Hansen database system. All material in the warehouse is cataloged by nomenclature, number, and size for inventory control purposes. The RWW tracks all inventory for accurate recording purposes and to maintain the required amount of inventory needed throughout the City.
- The security system that Hansen offers to prevent unauthorized access to various areas of the database system uses an extensive firewall which is included in their software. The RWW only authorizes select individuals to update inventory control in the main warehouse. This eliminates the possibility that unauthorized personnel have access to the database system which could decrease the accuracy of inventory in the main warehouse. The “mini warehouses” are responsible for their own inventory and they report inventory to the main warehouse via work orders and purchase requests. These reports are updated daily to maintain accurate inventory throughout the RWW service area.

- The ordering process has low inventory indicators that are found on the reorder level report (Appendix 9.5.) The ordering process begins when material quantity falls below the reorder level that is set by the supervisor of the main warehouse. The RWW keeps at least one of everything in the warehouse. The warehouse contains material that is never intended to be used, such as a very large water main coupling to repair a major water line break. But the coupling is available in the inventory just in case it is needed. Material used on a daily basis is maintained in a larger supply to meet the demands of the City. The Hansen software enables warehouse personnel to maintain and accurately track all inventory used in the water and sewage departments for accurate inventory control.
- The reporting system offered by the Hansen software gives the warehouse supervisor and superintendent reports and charts to keep them advised of the area and usage of inventory. This helps them to identify possibly problem areas in the City that require more investigation. For instance, if the city is using more than normal amounts of couplings on a section of main line it might indicate the main line should be replaced instead of repaired.

#### 4.6 Hansen Mobile System (HMS)

The Hansen Mobile System will soon be fully functioning at the RWW. It has been used as a pilot program for several months and is getting ready to go on line. The HMS system enables field personnel to close out work orders from the field. Doing so eliminates the need for someone to manually enter the data in the office and close them out. The HMS was found to offer advantages such as better field communications, automatically updating work orders, notifying dispatchers of unfinished work days, and real time GPS tracking of company vehicles.

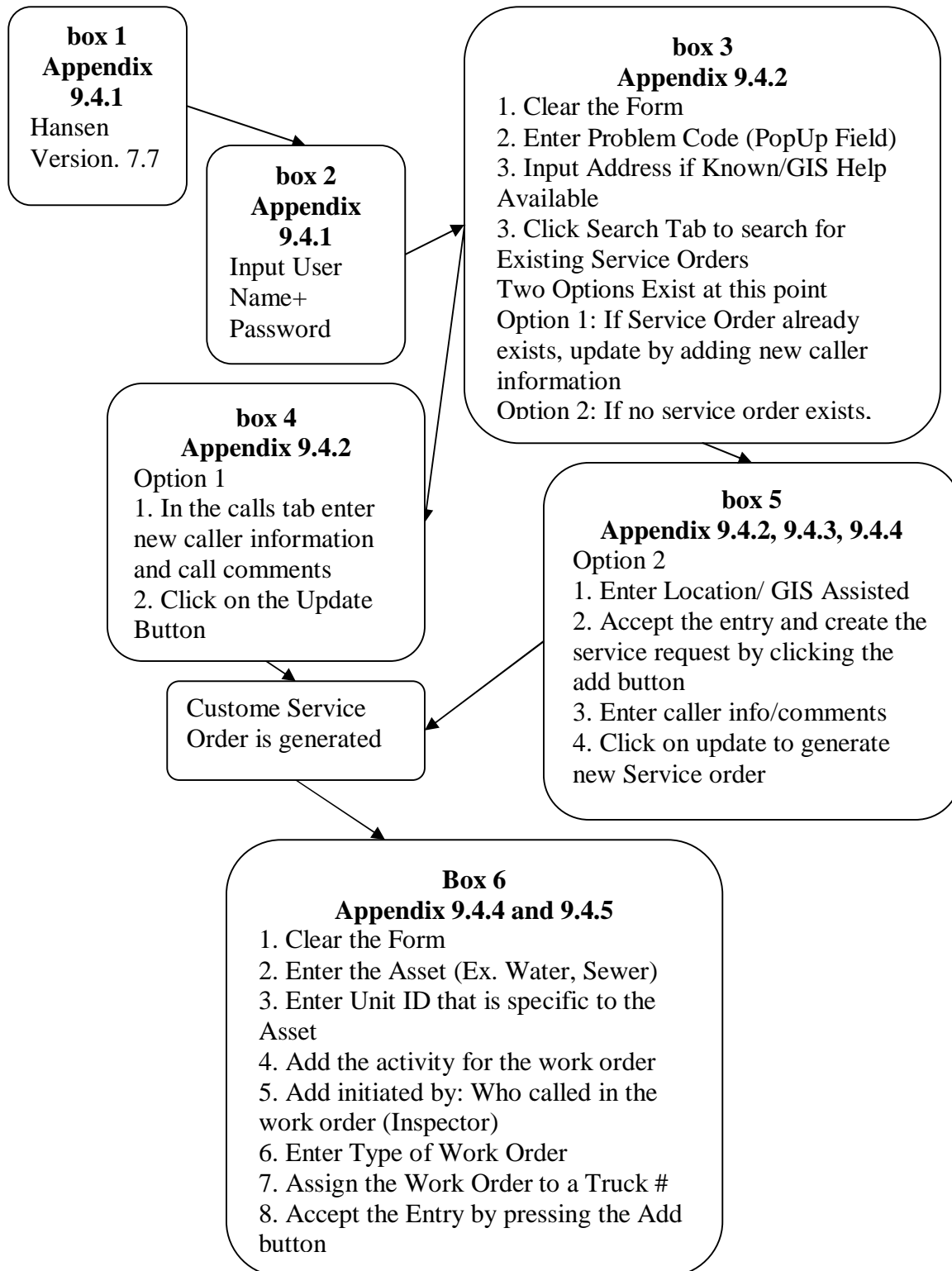
- Field communications with the RWW have increased because office dispatchers are able to send emergency as well as routine work orders to the field via data communications, making emergency response times better and improving customer service and relations. The data is received from cell phone towers located throughout Raleigh and its surrounding areas. The RWW has selected a third party vendor called Sprint Net Motion which offers a large broadband width to transfer map data. All information is transferred duplex and real time. If dead spots are encountered the data will be transferred as soon as the connection is reestablished. Functionality and price were the primary reasons for selecting the communications vendor for the City of Raleigh. The City's primary concern was finding a vendor that offered the necessary bandwidth to transfer map data.
- Another problem the RWW had was automatically updating work orders or closing them out when interfacing with the Banner Software system used by the Meter Reading Department. The senior support specialist in the warehouse had to manually close out work orders so that meter inventory could be updated. The HMS system will eliminate the need for additional intervention from warehouse personnel since

the meter department service personnel will have a real time interface with Hansen, enabling them to close or update work orders.

- When field personnel return to the office at the end of the workday they sometimes have unfinished work. In the past this would create problems with scheduling the next day's work. But presently the HMS system tracks carry over work to allow the dispatcher to move the work and assign it to someone else or to reschedule it for another time. This helps to prevent problems with work not being completed and it simultaneously increases customer satisfaction.
- The final noted advantage of procuring the HMS system was that it gives the RWW the capability of using GPS software for real time tracking of company vehicles. The new interface will offer advantages to the warehouse by locating vehicles at their current position. This will give upper management benchmarks as to driving times in various parts of the City which will help when scheduling a day's work. It will also allow supervisors to locate company employees in the field in case of work and non-work emergencies. During the pilot program the GPS software interface has already proven to be a beneficial aspect of the HMS system.

The advantages enumerated above, in the various aspects of field communications, work order management, and vehicle tracking, are expected to increase productivity and efficiency of RWW business operations. The RWW is doing more with fewer people and their requirements are expanding as they move into other cities. The use of the Hansen software has proven to be highly beneficial to the City.

Figure 1. Hansen Version 7.7 Flow Chart



The following chart restates the Hansen modules used by the RWW and introduces those proposed for use by U.S. Navy.

"Enterprise Productions Suite Modules"	Customer Relations Management	Financial Accounting	Revenue Management	Operations Management	Business Intelligence	Hansen Mobile Solutions
	Raleigh Water Warehouse	X				X
Navy Public Works Division (Proposed)	X				X	X

## 5.0 Naval Facilities Engineering Command

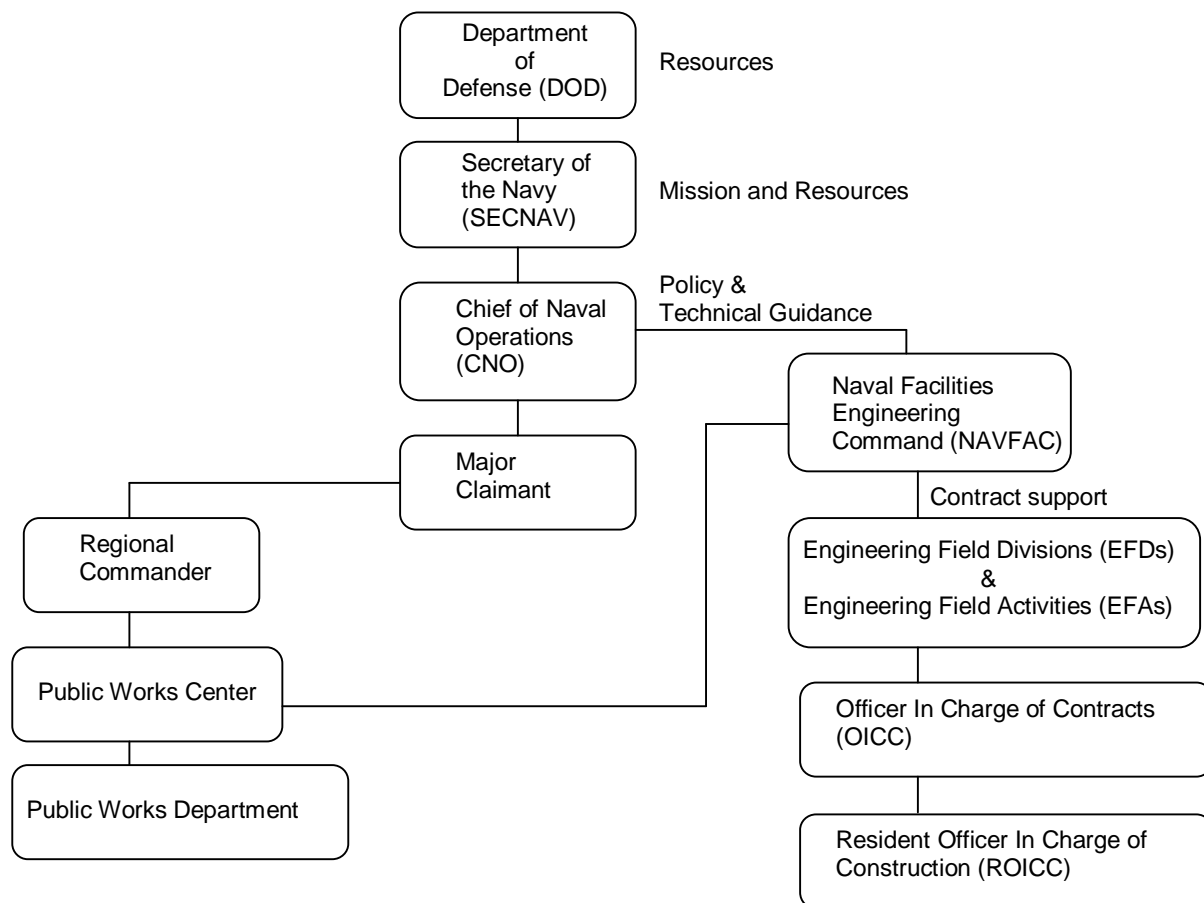
The Naval Facilities Engineering Command also commonly known as NAVFAC, is located in Norfolk VA, and is responsible for facilities, installation, and contingency engineering. NAVFAC experts serve the Navy and Marine Corp. NAVFAC is tasked with offering technical advice and guidance to Chief of Naval Operations (CNO), Major Claimants and activity commanding officers in planning, executing, and appraising the effectiveness of Naval and Marine facility maintenance programs. NAVFAC provides support to the CNO, the operating forces of the Navy, the Marine Corps, and other offices and organizations in regard to shore facilities and related engineering material and equipment. Within the NAVFAC Engineer Programs Group, the Public Works Directorate is the section charged with processes, resources, and assessment for installations management.

### 5.1 Organization

NAVFAC reports directly to the CNO for shore facility management and engineering expertise. The CNO reports to the Undersecretary of the Navy who in turn reports to the Secretary of the Navy (SECNAV). SECNAV works for the Department of Defense which reports directly to the President of the United States. The following chart (Figure 2) shows the chain of command described above. Not shown in the figure is the President of the United States.

The organization within NAVFAC is comprised of the Chief, who has the rank of Admiral. The Chief has a Vice Commander working for him; the Vice Commander has several departments that are all responsible to the Chief. The NAVFAC organization supports the Engineer Fields Divisions (EFDs) and Field Activities (EFAs). The EFDs and EFAs provide facility management and engineering support to the Public Works Officer. The EFDs and EFAs are staffed with specialists of all disciplines for engineering and facilities support. The EFDs and EFAs will assist the activity, the major claimant, or the sub claimant in engineering matters.

Figure 2. NAVFAC Chain of Command



## 5.2 Engineering Field Divisions (EFD)/Engineering Field Activities (EFA)

Engineering Field Divisions (EFDs) and Engineering Field Activities (EFAs) are tasked by NAVFAC to provide support to the activities, major claimants, and sub-claimants. The divisions are larger staffed and have more resources available to them. They are comprised of professional engineers of all disciplines that specialize in facility management and engineering. Their engineering expertise offers support to the Naval base where the Public Works Officers and Managers are located.

Activities are defined as the Naval base or Installation where the Public Works department resides. It is the Public Works Department that works for the base Commanding Officer as well as for NAVFAC.

A Major Claimant is a command that works directly for the CNO. The major claimant is to provide funding to the Naval installations under its area of responsibility. The Navy just recently consolidated major claimants from 18 to 8 in the hopes of reducing costs.

Claimant support assignments are predicated on geographic location of the claimant. The Claimant support functions performed by the EFDs for the Claimant's facility manager include those listed below.

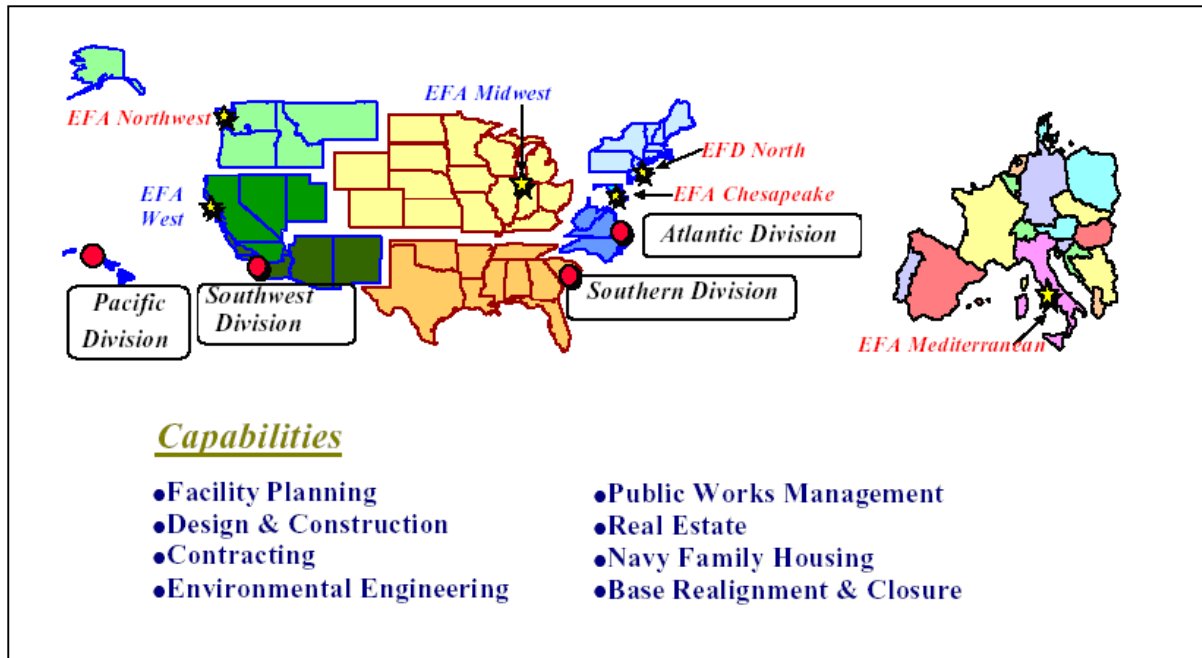
- Facility planning, design, and construction
- Contract management
- Guidance for developing a budget
- Guidance for developing Annual Inspection Summaries (AIS)
- Developing the Claimant's budget submission to CNO
- Developing the Claimant's AIS submission to CNO
- Developing the Claimant's Program Objective Memorandum (POM) issues for submission to CNO
- Providing facilities management program analyses
- Providing Claimant resource distribution recommendation (among Claimant activities)
- Activity assist visits upon request

The EFDs and EFAs are agile, global engineering organizations that provide contingency engineering; shore facilities planning, design and construction; and engineering support for base operations and maintenance. Their locations and capabilities are shown in Figure 3.

The EFDs and EFAs provide facility management support to activities in a defined geographical region. These are shown in Figure 3. This support is generally in terms of assuring that the Facilities Management System is functioning properly and that the activity's facilities management team is trained and aware of the latest issues in their area. Some of these support functions include:

- Conducting control inspector training
- Conducting facilities management training
- Providing special project review/validation (as tasked)
- Special project preparation and planning (as tasked)
- Reviewing Facilities Support Contracts (FSC)
- Conducting FSC training
- Conducting special studies in response to engineering service
- Engineering Service Request (ESR)

Figure 3. EFD/EFA Locations and Capabilities

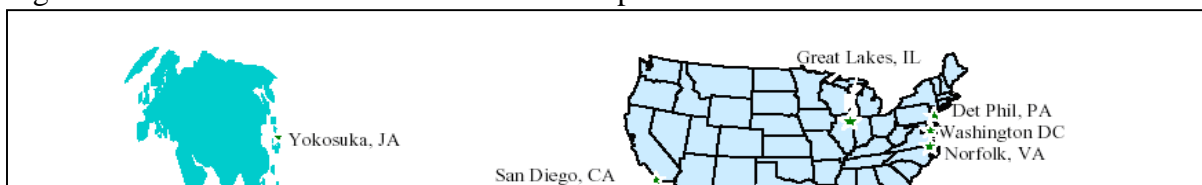


### 5.3 Public Works Centers

The Public Works Centers are base support providers to military, federal, state, and local activities located within ten regional areas serviced by the Public Works Centers and their detachments. Currently, Public Works Centers provide services to the Navy, Army, Air Force, Marine Corps, Coast Guard, DOD, National Aeronautics and Space Administration, state, and other federal and nonfederal organizations.

The Navy Public Works Center (PWC) provides facilities maintenance, support, and services to family housing, utilities services, transportation support, weight handling equipment support, and engineering services. Additionally, PWC provides shore activities planning support required by afloat and ashore operation forces and other activities. PWC have a unique Command and Control structure. The PWC operates under the command of the regional Naval Base Commander and also under the technical control of the Naval Facilities Engineering Command. Figure 4 shows the physical location of the PWCs throughout the United States.

Figure 4 Public Work Center Locations and Capabilities



#### 5.4 Public Works Departments

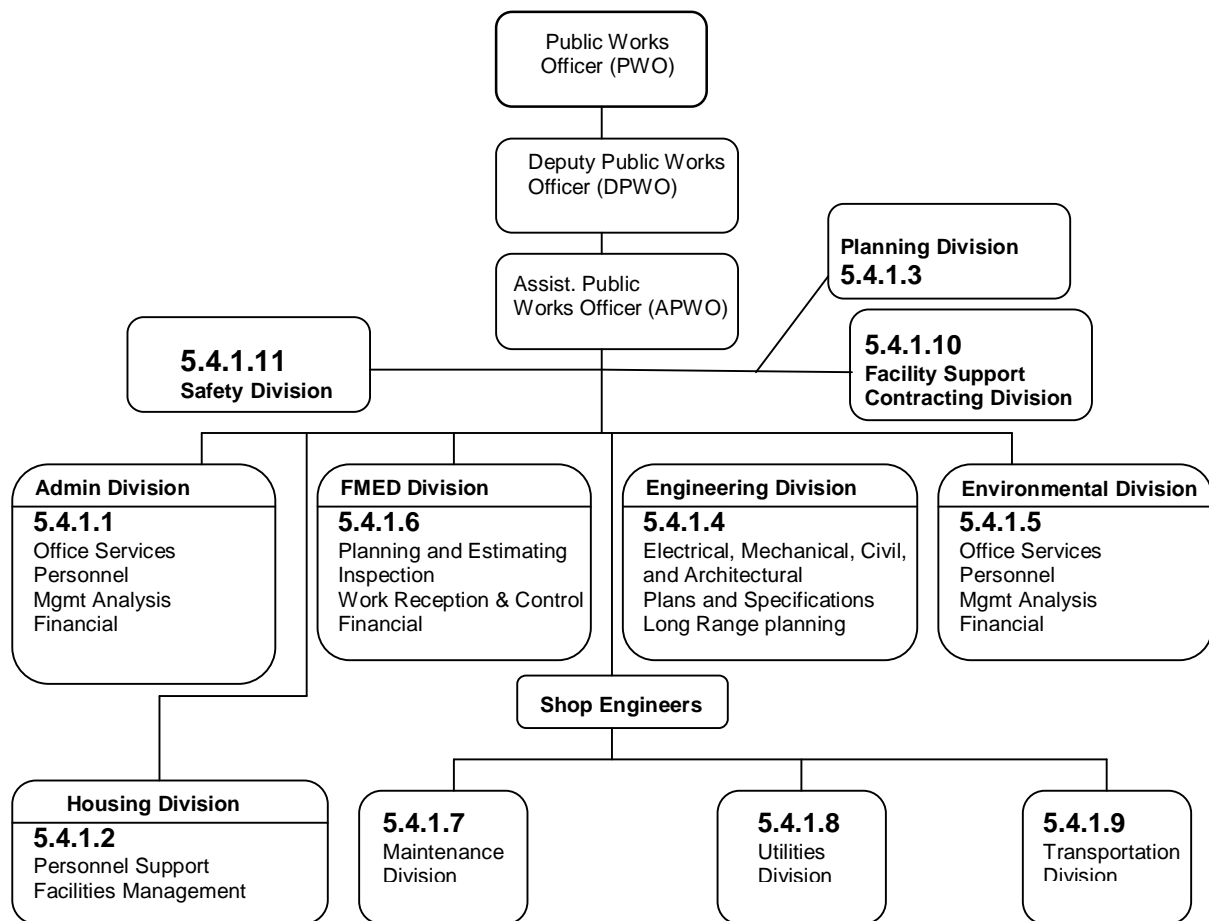
The function of Navy Public Works Departments (PWDs) is to provide the same types of services as PWCs in locations where PWCs are not available. PWDs are typically located on Naval bases where PWCs are not available and PWDs are under the direct control of the Navy base commanding officer.

##### 5.4.1 *Public Works Department Organization*

A typical Public Works Department organization is shown in Figure 5. The Public Works Department is headed by a Public Works Officer (PWO) who is usually the rank of Commander or Captain. The PWO has a Deputy Public Works Officer usually a civilian of equal grade, and an Assistant Public Works Officer with the rank of Lieutenant or Lieutenant Commander. The divisions are further divided into branches. Both the divisions and the branches that each contain are discussed in the subsections that follow.

Note that: Figure 5 has been labeled with the corresponding sections of the report. The figure there helps further explain the divisions in a PWD and gives the reader a visual representation of the divisions discussed.

Figure 5 Typical Public Works Department Organization



#### 5.4.1.1 Administration Division

The Administration Division oversees the payroll, finance, and the management analysis branches. The responsibilities of the Administration Division are to track and maintain all civilian pay records and to perform financial analysis for the budget. It is the responsibility of the Administration Division to develop the budget and present it to the PWO. The branches of the Administration Division are listed below.

- Personnel Branch
  - Liaison with Human Resource Office (HRO) for personnel actions
  - Manage the position management program
  - Keep payroll records
  
- Finance Branch
  - Develop and Present Budget
  - Fiscal and Job Order accounting
  - Maintain inventories of personnel property

- Management Analysis Branch
  - Internal management studies
  - Focal point for commercial activity studies
  - Operations Automated Data Processing (ADP) system for PW

#### 5.4.1.2 Family Housing Division

The Family Housing Division is responsible for all military members moving into or out of the area where the Naval base is located. The Family Housing Division will assist military personnel with acquiring military on base housing or civilian housing. They are responsible for the maintenance of all military housing, including government compliance with regulations and inspections. The following lists identify the branches and services that comprise the Family Housing Division.

- Personnel Branch
  - Housing referral service
  - HUD programs
  - Assignments and terminations
  - Leasing and acquisitions
  - Inventory and utilization reports
  - Collections
  
- Facility Management Branch
  - Financial management
  - Maintenance management
  - Occupant relations
  - Community support facilities
  - Occupancy inspections

#### 5.4.1.3 Planning Division

The Planning Division is responsible for long term construction project enhancements to the Naval base. The Planning Division is also responsible for developing and maintaining the base master plan which is a long range plan of future developments. The branches of the Planning Division are listed below.

- Project Development Branch
- Base Master Planning Branch
- Facility Documentation Branch
  - Basic Facility Requirements (BFR)
  - Facility Support Requirements (FSR)
  - Property records
  - Facility Planning Document (FPD)

#### 5.4.1.4 Engineering Division

The Engineering Division is responsible for developing the plans and specifications for projects prior to the request for proposal being sent out to contractors. It is the Engineering Division responsibility to work with the Resident Officer in Charge of Construction and provide technical assistance when inspecting construction projects. The Engineering division will also coordinate with the architecture and engineering firms developing the drawing for construction projects. The following list shown below further divides the Engineering Division into their respective branches.

- Production Engineering Branch
  - Plans and specifications
  - Technical disciplines
  - Field consultation
- Engineering Studies Branch
- Architect and Engineering coordination (A/E) Branch
- As-built Drawings Branch
- Base Exterior Architecture Plan (BEAP) Branch

#### 5.4.1.5 Environmental Division

The Environmental Division is responsible for ensuring that facility is complying with all federal, state, and local regulations. They are heavily monitored by the Environmental Protection Agency (EPA) and have many federal environmental programs that are closely monitored by EPA. Some of these programs include, but are not limited to, clean air and emissions act and water quality. The Engineering Division will review all construction and support contracts to ensure environmental compliance and apply for variances when needed. The Engineering Division is further broken down into the following branches.

- Administrative Branch
- Compliance Branch
- Operations Branch
- Natural resources Branch

The Environmental Division is also responsible for endangered species, be they animals, birds, reptiles, or anything else that may appear on the endangered species list. Areas such as wetlands or other protected habitats fall under their jurisdiction as well. The Natural Resource branch is directly responsible for those issues and reports directly to the Environmental Officer.

#### 5.4.1.6 Facilities Management Engineering Division (FMED)

This division is responsible for the maintenance and construction of all facilities used on a Naval base. This department will prepare the RFP and work with the contracting officer for submission to contractors as well as do an estimate for labor and materials. The FMED will provide their own project managers to monitor and inspect construction projects. Projects

can include new construction, remodeling, and upgrades to base facilities. FMED usually contains two branches.

- Works Generation Branch
  - Inspection
  - Planning and estimating
  - Material control
- Works Management Branch
  - Budget and resource planning
  - Work reception and control
  - Analysis and productivity

#### 5.4.1.7 *Maintenance Division*

The Maintenance Division is of particular importance to this paper because it resembles the RWW water and sewer divisions. It is comprised of various shops to maintain all base facilities. The Maintenance Division has a warehouse for material, a fleet of vehicles, supervisors, and shops with field personnel. It is the processes of the Maintenance Division which will be discussed in detail in Section 5.4.2 and it is this division for which the Hansen software may be most ideally suited. The Maintenance Division contains the branches listed below.

- Administrative material support branch
- Shops and trades branch
  - Electrical
  - Mechanical (to include plumbers, pipe fitters, heating and ventilation technicians)
  - Water
  - Waste water
  - Wood shop( is either supervised by civilians or Navy Seabees)
- Emergency service branch
- Preventive maintenance branch
- Shop labor branch

#### 5.4.1.8 *The Utilities Division*

This division is comprised of a utility officer, energy management engineers, and mechanical engineers. They have a responsibility for all of the utilities and their infrastructure to include electrical, water, sewage, and gas operations for the installations. Some of these utilities may be contracted out due to costs, but many of them still remain as Public Works Department responsibilities. Duties of the various personnel include billing, utility mark-outs, assistance to the maintenance divisions for utility operations, and energy management procedures.

- The utility officer is responsible for all aspects of the billing process for the utilities discussed above. Monthly reading are usually taken manually and then entered into a

spreadsheet for billing. Various reports must be developed and give to the Major Claimants, Commanding Officers, and Public Works Officers for future budgeting analysis. The reports listed below are how the Navy measures the use of the utilities on an installation.

- Utility Cost Analysis Report (UCARS)
  - Defense Utility Energy Reporting System (DUERS)
  - Energy Audit Report (EAR)
- The energy managers are responsible to the utilities officer with respect to energy concerns. The energy manager seeks new and creative ways of conserving energy. Energy and utilities are a significant part of the shore infrastructure cost, since they consume an average of 40% of a Command's shore operating support budget. The department is working on the combined goals of reducing energy consumption and reducing the cost of energy and utilities. Energy Conservation is required by the Energy Policy Act of 1992 and [Executive Order 13123](#), signed 3 June 1999 (replacing Executive Order 12902). The guidelines provided in these two documents require all federal agencies to reduce energy consumption 30% by 2005 and 35% by 2010 using 1985 as the baseline.

The Utilities Division is further divided into branches listed below

- Electrical Branch – The Electrical Branch is responsible for all power and emergency power requirements for the base. This branch will respond 24 hours a day in the event of an emergency. The branch will work with other public works personnel to coordinate scheduled power outages. The electric branch supervisor oversees all electrical needs of the base.
- Wastewater Branch – The Waste Water Branch is responsible for everything that contains or transports waste water. Their expertise is in maintaining and operation of commercial as well as residential systems. They are also on call 24 hours a day to handle wastewater emergencies.
- Water Branch – The Water Branch is responsible for administering all potable water needs to the base. If there are wells on the base, it is the water branch personnel responsibility to ensure that well water is being treated properly through the filtration system. Water emergencies are investigated and handled by this branch on a 24 hour a day basis.
- Steam and Air Branch – The Steam and Air Branch is responsible for all heating, cooling, ventilation, and air condition (HVAC) for the base. Their duties include 24 hours operation of boilers during the heating months or when Naval exercises are commencing. This branch is responsible for converting the base from heating to cooling or vice versa depending on the time of year.
- Energy Management Branch – The Energy Management Branch is responsible for all aspect of managing energy use on the base. It is also their responsibility to educate individuals about energy awareness. The energy manager is responsible for maintaining, updating, and preparing all the energy records and reports for audit.

#### 5.4.1.9 Transportation Division

The Transportation Division is responsible for all maintenance and procurement of government vehicles. This division schedules periodic maintenance on all government equipment to include construction support equipment such as front end loaders and backhoes. If there is a school bus system on the facility they will be responsible for that as well. Some transportation divisions will purchase or lease their own school buses and provide drivers to the various military or public school systems. In the northern regions where snow is a problem they are also responsible for snow removal of the facilities roads, parking lots, and sidewalks. This is sometimes contracted out by the facilities support contracts division described in Section 5.4.10 but not always. The branches contained within the division are listed below.

- Production Control & Dispatching Branch
- Equipment Maintenance Branch
- Operations Branch

#### 5.4.1.10 Facilities Support Contracts Division (FSC)

This division is responsible for the process of support and service contracting for the operations and maintenance of the facility. Their support services include contract types, acquisition planning, specification preparation, modifications, pricing, execution, options, and payments. The facilities support managers oversee facility contracts such as lawn maintenance, snow removal, garbage pickup, janitorial, and custodial maintenance. These are among the most common types of support to be contracted out. The facilities manager will develop the specifications for the request for proposal (RFP) for all facility-based contracts and work in conjunction with the contracting officer when letting the contract. It is not uncommon to solicit assistance from the EFDs and EFAs to help and guide this process. The branches are listed below.

- Administrative Branch – The Administrative Branch is responsible for the specifications and estimating the contract. This branch is divided into specific disciplines including electricians, plumbers, pipefitters, masonry, and concrete, among others. Each discipline will be assigned personnel who do their share of the specification development and estimating on the contract.
- Quality Assurance Branch (QA) – The Quality Assurance Branch is responsible for inspecting the construction process. The QA responsibility is to ensure the project is being constructed to the specifications of the contract.

#### 5.4.1.11 Safety Division

The Safety Division is responsible for administering the Navy Occupational Safety and Health (NAVOSH) program. Their primary focuses are accident prevention and awareness. They investigate, record, and report all accidents and mishaps. They enforce safety directives and ensure that they are followed. The Safety Division identifies and corrects all unsafe and unhealthy acts and conditions. They provide all base personnel with the training and issue of personnel protective equipment and tools. Safety Division personnel coordinate with other divisions and departments such as property owners, medical, human resource office, unions, and Occupational Safety and Health Administration (OSHA) when mishaps occur. The Safety Division branches are listed below.

- Administration Branch
- Training Branch
  - Asbestos Management Program
  - Hazardous Material Program
  - Electrical shock
  - Confined space entry
  - Personnel fall arrest systems
  - Trenching and excavation
- Regulation and Code Enforcement Branch
- Inspections and Oversight Branch

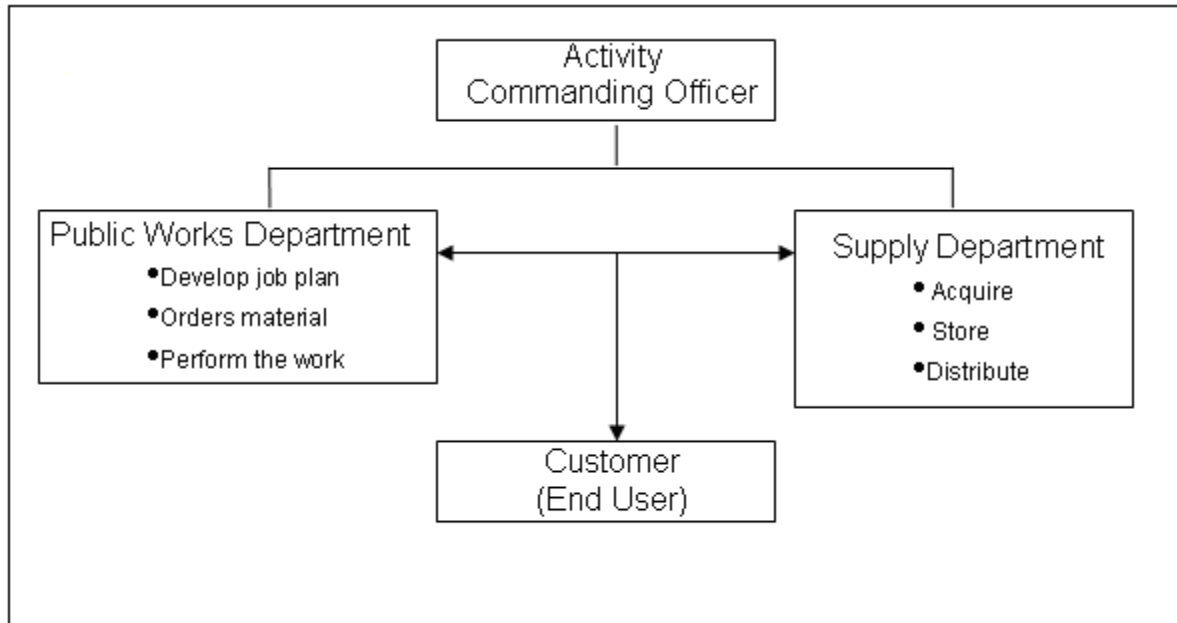
#### 5.4.2 *The Procurement Process*

The Public Work Departments and Public Works Centers use the Navy Supply System for the procurement of materials. The procurement procedure is basically the same for the PWC and PWDs. The only difference is, in the PWDs, the base Commanding Officer oversees the procurement process, unlike the PWC where the Commanding Officer of the PWC is in charge of procurement.

This paper focuses on the procurement process for the PWDs because, as stated in Section 1, the PWDs in the Navy resemble the RWW. The Navy Supply System works in conjunction with PWDs in ordering and purchasing materials. It is the responsibility of the PWDs to provide the necessary documentation for the procurement system to work properly.

The basic function of the PWD is to develop the job plan, order the material, and perform the work. The parties involved are shown in figure 6. The function of the Supply Department is to acquire, store, and distribute material for the PWDs. If both of these departments work correctly together then the customer (end user) is satisfied.

Figure 6. Responsibilities of the PWD and the Supply Department



Material Management is the responsibility of the FMED in the Public Works Department. Their responsibilities for material requisitioning include the following.

- Date required
- Cost estimate
- Types, quantities and quality
- Supplementary information
- Recommend procurement sources
- Review discrepancies and take corrective action

#### 5.4.2.1 Public Works Department and Supply Department Relationship

When the necessary information is received from the FMED (usually in spreadsheet form), the Supply Department enters the request into its own program and database. They will do a search to determine if the material is in stock. If it is in stock they notify FMED with an email message and the PWDs will pick up (or the Supply Department will deliver) the material to the appropriate location. The PWDs will sign a receipt and take possession of the requested material. If the material is not in stock several factors must be considered.

- Identification
- Special factors
  - Statutory regulations
  - Estimated dollar value is so that the correct purchase method can be chosen
  - Location
  - Lead times
- Priority
  - Uniform Material Movement and Issue Priority System (UMMIPS), this is a priority system used by the Navy to determine the urgency of materials
- Purchase

- Local indefinite quantity and/or indefinite delivery contracts
- Blanket purchase agreements
- Simplified acquisition procedures purchases for material up to \$100,000
- Credit card up to \$2,500
- Direct vendor which usually delivers material for the Supply Department

When the purchase method is determined there is an order of precedence that must be followed. This precedence is

1. Navy Supply System (Mandatory)
2. GSA Federal Schedule
3. Department of Defense Indefinite Delivery Contracts (IDC)
4. Open market

If the material can't be purchased in the Navy Supply System, then the next step is to look for it in the GSA Federal Schedule. This process continues until the material is eventually purchased in the open market. If the purchase is a sole source purchase then it is purchased in the open market after the required justifications are approved.

#### 5.4.2.2 Public Works Department Material Accountability

When the material is pick-up or delivered to the PWD there is something called shop stores categories. These categories determine how the material will be stored in the department. The categories are:

- MSI – Material Supply Inventory
- DMI – Direct Material Inventory
- Turn-ins
- PEB – Pre-Expended Bins
- Bench stock

The Material Supply Inventory is material that is readily available to on a day to day basis of operation. This usually requires a 60 day supply of material inventory. The range and size of material is usually determined by demand history. The material is not charged to the customer until issued on a particular request. Emergency items are also considered as MSI for mission essential materials to repair or prevent a problem from occurring. This material is usually less than 10% of the total shop stores including DMI.

The Direct Material Inventory is material that is planned or staged in advance of the start of a project. This material is charged to the customer when the material is staged.

Turn-ins are excess material that is required to be returned to the warehouse after the completion of a job. The material is held in inventory for future use in other jobs. The customer is credited when the material is returned.

Pre-expended bins are where low cost and high volume material is stored. The shop supervisor is usually responsible for the inventory and ordering of these materials. The

material is located in the shop or on service vehicles and is used for service call work. The customer is charged for this material when it is used on the job.

Bench stock is similar to the PEBs, but this material is located at the individuals work station.

The PWD has concerns for the materials that are procured. These concerns are the timeliness of materials, substitutions, sole source, material disposal, “gold piling,” pilferage, loss, and theft. These concerns are something that face all Public Works Departments and must be addressed to maintain a well organized procurement process. When PWDs establish guidelines such as personnel accountability for materials, proper disposal, and ensuring that the inventory and ordering process is being conducted on a recurring basis, most of these problems should be alleviated and the material management process will be working for the internal as well as the external customers.

#### 5.4.2.3 Resolving Problems Between the PWD and the Supply Department

There must be good communications between the PWDs and the Supply Department to procure material in a timely and efficient manner. Agreements such as those noted below should be established because of the turnover of managers in a military environment.

- Station Instruction Agreement
- Memorandum of Agreement (MOA)
- Memorandum of Understanding (MOU)

Unfortunately, it is sometimes the case these guidelines are not implemented and enforced. There have been inefficiencies in the procurement process, in material handling, and inventory control of materials in the PWDs. If the Supply Department and PWDs could communicate better in the ordering process (with the use of material management software), it would make their jobs easier and would provide increases in efficiency. The Hansen Software is one solution that would help with these inefficiencies because Hansen understands these types of processes and can easily integrate their software with other database programs to eliminate the need for changing existing software. The internal problems in the PWDs can also be addressed with the inventory control systems provided by Hansen. The means and methods used in the Raleigh Water Warehouse, and in the case studies discussed earlier in this study, can be used as examples to eliminate these problems faced by a Public Works Department.

### 5.5 The Acquisition Process

The acquisition process of acquiring the software for a Navy Public Works Department is similar to the process that the RWW followed. A needs assessment report (Appendix 2, Section 9.2) has to be done first through interviews and workshops with staff personnel and shop employees who would be affected by the implementation of the new software system. The Navy would require more collaboration with other divisions throughout the installation before a thorough needs assessment could be accomplished. Once the needs assessment report is completed, an analysis of the existing business processes in the Navy Public Works Department can be conducted to determine the current business process. Documenting the

current process will identify the department's shortcomings in the operation management system. A committee would be formed from the various divisions in the Public Works Department and other divisions from the installations that would include management as well as hourly employees. The committee would be involved in all aspects of the acquisition process, including choosing the final vendor.

#### 5.5.1 *Analysis of the Existing Business Processes*

The analysis of the existing business practices would require written explanations of business processes made into flow charts. Once the flow charts are developed they would be distributed out to the respective divisions with explicit instructions on how to verify, update, and return the flow charts. It is important that the flow charts are seen by everyone in the department and that everyone concerned has the opportunity to review them. Once the flow charts are received, the committee will review, update and send out the revisions. The process would continue until no more revisions are necessary. This cyclic process would be executed for all business processes identified by the PWD. The resulting flowcharts would indicate the strength and weaknesses in the existing business process. This information would be made part of the RFP and allow the vendors the opportunity to suggest improvements at the pre-bid conference and when bidding on the proposal.

#### 5.5.2 *The Request for Proposal (RFP) Process*

The RFP is the formal document that communicates the Government's requirements to industry and solicits proposals from them to satisfy those requirements. The RFP will describe all deliverables, specify anticipated delivery schedules (which are subject to negotiation), include contract clauses and special provisions (some of which are negotiable), include attachments for deliverable data, contract security requirements, as well as the identifying technical order (ITO) and will include the evaluation criteria used to select the vendor. It must be noted that after the RFP is issued, the only person authorized to contact any contractor about anything in the RFP is the Contracting Officer.

The vendors chosen to bid on the RFP will be selected from the research done on the analysis of the business process (Section 5.1.1) and or a thorough investigation of other software vendors capable of producing the software for the needs of the Public Works Department such as this report has done for the Hansen Information Technologies Company. It would be recommended to have at least 5 software vendors bid on the project.

The RFP document will comprise of the following sections

- Introduction
- Administrative information
- System requirements
- Technical requirements
- Implementation requirements
- Vendor and product information
- Vendor pricing information

When the RFP is received, each interested will determine if they can be a responsible bidder. In the RFP there will be a pre-bid conference scheduled to allow all perspective vendors the opportunity to meet and ask questions of the Public Works Department and Contracting Officer prior to the submission of their proposals. The proposals will have to be submitted at the time requested and with all information in the bid package. If the vendor is late or does not have all the information requested it will be returned unopened and that vendor will be considered non responsive.

### *5.5.3 Proposal Evaluation*

When all proposals are received by the Contracting Officer, an intensive analysis will be conducted to evaluate them and to choose the best software vendor for the project. This analysis will include reviewing all questionnaires received by the vendors and grading them using an appropriate scale. The grading criterion has not been developed yet, but prior to the RFP being submitted this would be accomplished. The selection process would look at system, technical, and implementation requirements first, and then price. Even though price is an important factor it may not be the most important just like in the case of the RWW selection of Hansen.

### *5.5.4 Presenting the Product*

The selection process as described in the RFP will require the 3 best vendors to present an approximately 2.5 hour presentation of their product. This presentation would contain the vendor's response to information provided in the RFP. The vendors would be given a certain number of minutes to describe their response to various sections of the RFP. The last part of the presentation would be a question and answer period. This will be the last time the vendors have an opportunity to present their product prior to the final selection process. After the vendor's presentations, the committee would decide on the best vendor suited for the Public Works Department.

### *5.5.5 Final Selection*

The final selection would be conducted by the committee formed in the beginning of the acquisition process. The selection criterion used would be the answers received and presentations made by the various vendors. A grading system would be used to determine the best vendor for the Public Works Department. The evaluation process would be comprised of the following three components.

- Proposal response score
- Product presentations
- Client reference checks

These three items would be given an individual percentage out of the total 100% and would be used to select the final vendor. All of this information would be included in the RFP. All vendors would be fully informed of the selection process used. When all scores are totaled the vendor with the highest score would be chosen and negotiations would proceed with that vendor. A contract would be awarded to the selected vendor chosen through the Public Works Department selection process. The contract would explain the required process of

developing and installing the software. The process would be divided into different implementation phases so as to limit department disruption.

#### *5.5.6 Develop the Program Objective Memorandum (POM)*

The POM will identify milestones in the development and installation of the software. It is recommended that phase 1 would concentrate on the work order processes and the inventory control systems for the various departments of the PWD. An extensive analysis would have to be completed on the PWD existing database and the conversion process to the new software would have to be defined and documented. Furthermore the migration plan from the existing to the new system would have to be described. Phase 2 would constitute the implementation of the wireless technologies for the Maintenance Division. Additional research would have to be conducted and a RFP submitted for the 3<sup>rd</sup> party vendor to provide the wireless data communications.

#### *5.5.7 Training*

In the contract there will be a section requiring training of existing personnel on the use of new software. The training will have to take into consideration the experience of all concerned. Some employees will have extensive computer skill and others will have only basic skills. The training program proposed by the software vendor will have to be timely. The employees need to be trained either before or right after the installation of the software. Another consideration is whether it be best for the employees to receive their training on site or at the vendor's company. If it is determined that training should occur before the actual installation of the software, then it would be better for the employees to receive their training at the vendors' site, since the software will be available there along with the training program itself. A lump sum price would be guaranteed by the contractor for training in the contract. If the price for training was to exceed that price, then a modification would have to be made to the contract.

Training for the IT department on the installation would also have to be done. It would be recommended that special training be given at the vendor's company. This training would be more of a technical nature to handle problems as they occur during the installation process. The IT personnel would be recommended by the individuals on the committee formed during the acquisition process.

#### *5.9.8 Maintenance*

Maintenance will also be included in the contract for vendor support and the subsequently for upgrades. The contract will propose that the vendor have at least one (or maybe more) software specialist at the PWD for the first month. This will ensure that the process of implementing and converting to the new system will go as smoothly as possible. After that, there will have to be a maintenance agreement to ensure that technical support would be renewable on a year to year basis. Free upgrade installation should be part of the original contract. It is important to establish a well defined maintenance program to identify and correct issues as they occur.

## **6.0 Conclusions**

The research in this paper has offered considerable evidence that the Hansen Information Technologies Company “Enterprise Production Suite” is applicable in a public works environment. The nine case studies that were presented in Section 3 discussed actual problems, solutions, implementations, and results of various Public Works Departments throughout the United States. All of the case studies, as well as the experiences of the RWW, indicate that Hansen offered an exceptional product as well as exceptional customer service.

The Hansen Mobile Solutions (HMS) offers the ability for wireless data communications from the field to warehouse. The HMS system integrates well with existing GIS software to increase the capabilities for the customer. The RWW uses the GIS capabilities to locate service personnel as well as to identify water and sewer assets in the field. The HMS system creates better efficiencies and productivity by allowing field personnel to stay in the field and receive emergency and non emergency work orders. It also lessens wear and tear on vehicles and reduces fuel use.

The Hansen software offers a turnkey solution to most problems that Public Works Departments encounter. The software is usable right off the shelf as well as it is customizable. Hansen will develop the software to meet the needs of the customer. If the business processes are provided to Hansen before the implementation of the software, then Hansen can modify its software to match the business processes of the customer. If the software is used as a turnkey operation, it is possible that slight modifications will have to be performed on the Hansen software to match the business process of the organization in which it is being installed.

## **7.0 Recommendations**

The Navy should consider implementing software similar to the Hansen software discussed in this report for its Public Works Department. Hansen software would certainly be one of the vendors considered when the RFP is initiated. The Hansen software would meet the requirement of a Public Works Department. The RWW is comprised of many of the same Maintenance Division Branches described in this paper. The inventory control the RWW as implemented will also work well with Public Works Department.

Further study should be undertaken for the Navy in developing and implementing these types of software solutions. This paper focused on a Public Works Department, but this same type of software could be used in a Navy Public Works Centers, Supply Departments, or other departments that use the same type of business process as a Public Works Division. Furthermore, consideration could be given to the use of other Hansen modules, as appropriate, by other departments.

The Hansen software should be evaluated in the Civil Engineering graduate class “Materials Management in Construction” (CE 763) at North Carolina State University. This class offers construction specific models for integrated materials management; computer usage; and vendor analysis. The study of current issues and development of practical solutions to real-world problem are accomplished by intensive case study analysis. The Hansen software

should be further evaluated for its functionality in a construction company's material management business process. There were many parallels discovered between the RWW and a private construction business during the research for this paper.

## 8.0 References

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6. **Commanding Officer’s Guide to a Public Works**, NAVFAC P1040, June 1999
7. **Rasdorf, W.**, "Business Process Analysis of the City of Raleigh Public Utilities Water Warehouse," Technical Report, North Carolina State University, Raleigh, NC (September 2004). [150]

## 9.0 Appendices

- 9.1 Appendix 1: Enterprise Production Suite Modules and Sub Modules, Section 2.0
- 9.2 Appendix 2: Needs Assessment Report by CH2M-Hill, Section 4.1
- 9.3 Appendix 3: Sections 3, 4, 5, and 6 of the RFP, Section 4.1
- 9.4 Appendix 4: Hansen Version 7.7 Screens of the Work Order Management System, Section 4.4
- 9.5 Appendix 5: Reorder Level Report, Section 4.5
- 9.6 Appendix 6: Work Order Management Procedure Manual, Section 2.5.1
- 9.7 Appendix 7: Inventory Control Procedure Manual, Section 2.5.1
- 9.8 Appendix 8: RWW Business Process Flow Chart
- 9.9 Appendix 9: Contact List
- 9.10 Appendix 10: Service Request Example
- 9.11 Appendix 11 Work Order Example

## 9.1 Appendix 1: Enterprise Production Suite Modules and Sub Modules

Hansen's enterprise product suite includes the following integrated solutions:

- Citizen Relations Management (CRM)
  - Code Enforcement
  - Complaints
  - Dispatching
  - Knowledge Base
  - Service Requests
  
- Financial Accounting
  - Accounts Payable
  - Accounts Receivable
  - Encumbrances Accounting
  - Fund Accounting
  - Fixed Asset Management (GASB 34)
  - Grants Management
  - Inventory Control
  
- Revenue Management
  - Assessments
  - Fines
  - Grants
  - Property Tax
  - Permits and Licenses
  - Special Fees
  - Utility Billing
  
- Operations Management
  - Building Permits
  - Budget Management
  - Business Licensing
  - Code Enforcement
  - Condition Assessments
  - Fleet Management
  - Materials Management
  - Operations & Maintenance
  - Parks & Recreation
  - Public Works
  - Sanitary Sewer Management
  - Stormwater Management
  - Transportation
  - Timesheet Reporting
  - Treatment Plant Maintenance
  - Water Distribution Management

- Work Order Management
- Business Intelligence
  - Business Scorecards
  - Performance Metrics

9.2 Appendix 2: Needs Assessment Report Inventory and Work Order System

9.3 Appendix 3: Sections 3,4,5 and 6 of the RFP

9.4 Appendix 4: Hansen Version 7.7 Screens of the Work Order Management System

Appendix 9.4.1

Box 1  
Hansen Name &  
Ver.

Box 2  
User Name/  
Password

Database IWOSP  
User Name EVANSS  
Password

v7.70 r4.001.001

OK Cancel

## Appendix 9.4.2

The screenshot shows a 'Service Request' window with the following fields and sections:

- Service # [ ] Problem [ ]
- Call Date [ / / ] : [ ] Priority [ ] Call Duration [ 00 : 00 ]
- Taken By [ ] Responsibility [ ] # of Calls [ ]
- Source [ ] Project [ ]
- Customer Contact Requested Budget # [ ]
- Service Request Progress:
  - Schedule (not loaded)
  - Inspect (not loaded)
  - Resolve (not loaded)
- Knowledge Base:
  - Search [ ]
- Bottom tabs: Info, Location, Calls, Comments, Work Orders, Log, Linked, Search

Box 3/Box 5  
Tab to enter  
address

Box 4  
Option 1  
Enter new callers  
information

Box 3  
Search Tab to check for  
existing work orders

## Appendix 9.4.3

The screenshot shows a 'Service Request' window with the following fields and sections:

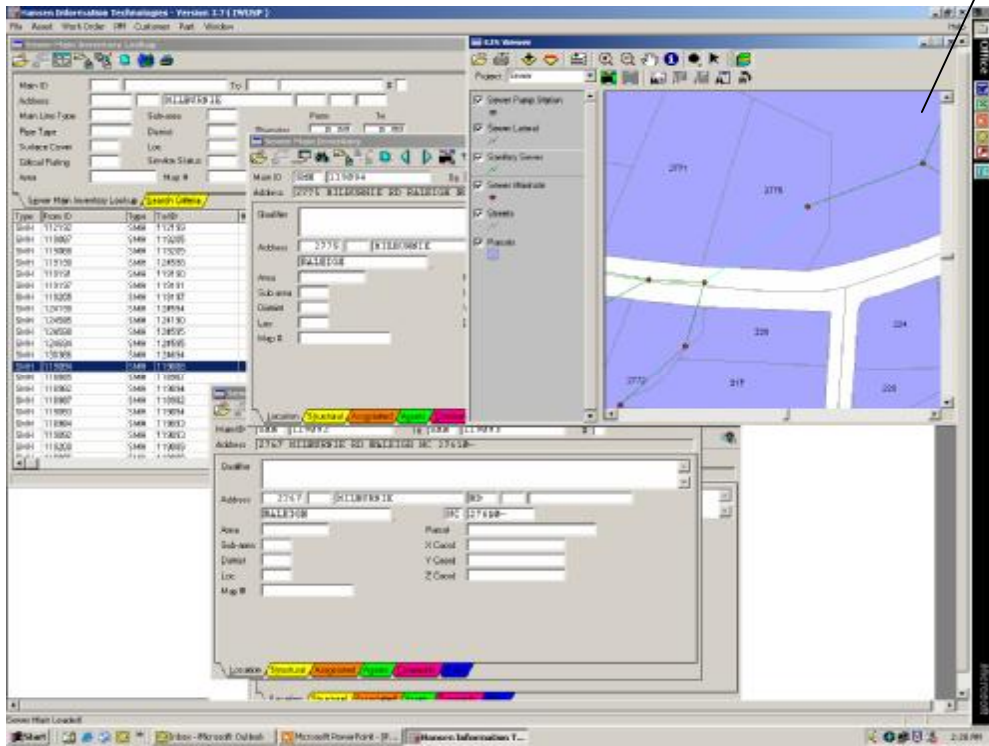
- Service #  Problem
- Call Date  Priority  Call Duration
- Taken By  Responsibility  # of Calls
- Source  Project
- Customer Contact Requested Budget #
- Service Request Progress:
  - (not loaded)
  - (not loaded)
  - (not loaded)
- Knowledge Base:
  -
- Bottom tabs: Info, Location, Calls, Comments, Work Orders, Log, Linked, Search

Box 3/Box 5  
Tab to enter  
address

Box 4  
Option 1  
Enter new callers  
information

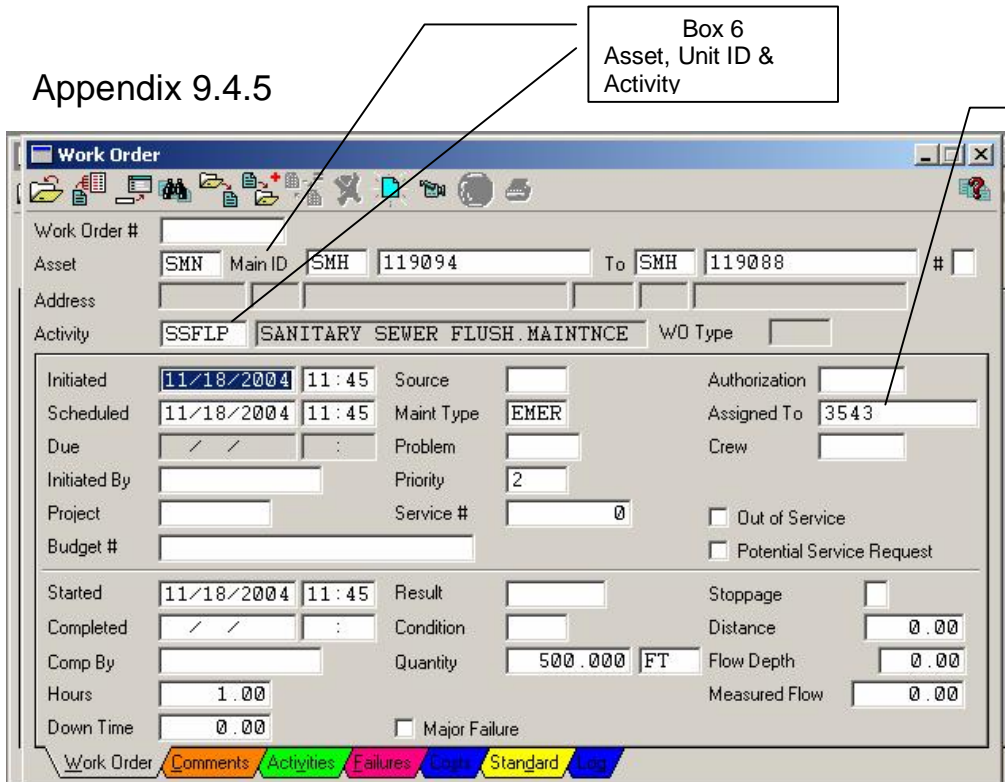
Box 3  
Search Tab to check for  
existing work orders

### Appendix 9.4.4



Box 5  
GIS assisted

### Appendix 9.4.5



Box 6  
Asset, Unit ID &  
Activity

Box 6  
Assign  
Truck #

## 9.5 Appendix 5: Reorder Level Report

9.6 Appendix 6: Work Order Management Procedure Manual, Section 2.5.1

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