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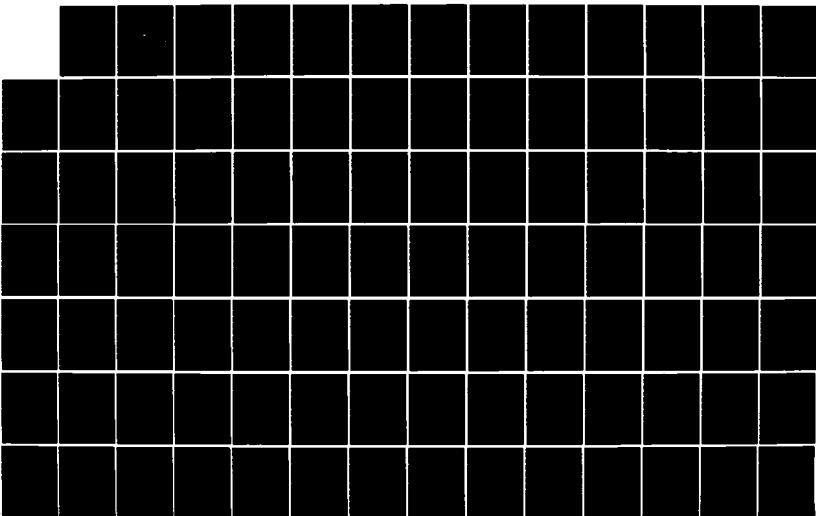
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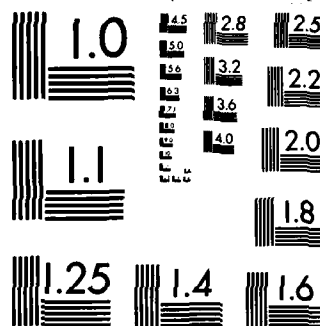
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NAVAL POSTGRADUATE SCHOOL

Monterey, California



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THESIS

A LOGICAL DESIGN OF THE
NAVAL POSTGRADUATE SCHOOL HOUSING OFFICE

by

Alexander W. Calder

March 1985

Thesis Advisor:

Barry A. Frew

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A Logical Design
of
The Naval Postgraduate School Housing Office

by

Alexander W. Calder
Lieutenant, United States Navy
B.S., Youngstown State University, 1977

Submitted in partial fulfillment of the
Requirements for the degree of

MASTER OF SCIENCE IN INFORMATION SYSTEMS

from the

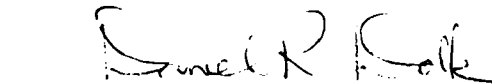
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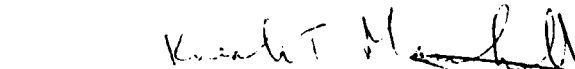

Alexander W. Calder

Approved by:


Lt. Barry A. Frew, Thesis Advisor


Daniel R. Dolk, Second Reader


Willis R. Greer Jr., Chairman,
Department of Administrative Sciences


Kneale T. Marshall,
Dean of Information and Policy Sciences

ABSTRACT

Navy Housing activities have been automating internal administrative functions through the purchase of office automation equipment. This thesis provides a comprehensive study and logical design of the facilities management branch of a housing activity utilizing the La Mesa Housing Project as a model.



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I. NAVY HOUSING FUNCTIONS

A. BACKGROUND INFORMATION

1. Thesis Background

In July of 1984, the La Mesa Housing Project of the Naval Postgraduate School received a Wang Office Information System model 60 (Wang OIS-60). This system was purchased because of a NAVFAC directive that housing activities should pursue automation of internal operations to increase productivity. Prior to its installation, a discussion with Charles Pooler, Assistant Housing Manager, indicated that a requirements analysis of the housing activity could be useful to allow for the full utilization of the new system.

This thesis is a conceptual study of the logical functions provided by the Facilities Management Branch of the La Mesa Housing Project. The study is documented at a high level, that is, it does not address control of functions or the implementation details. Functions are identified and explained utilizing a structured analysis technique. This involves decomposition of the major functions which are then organized hierarchically. The narrative function definitions describe that function and the next lower level of detail, but this level of detail is not graphically depicted. A data flow diagram shows the flow of data between the lowest level functions. Required data is then identified in a data dictionary and depicted graphically to show functional utilization of this data. External interfaces identify those data flows where the information

exits from the system. The data usage charts show high level input data needed for each function, and what the output will be. Finally, the data relationship charts show graphically what entities, in turn, require some data from another entity. The conclusion then discusses the view of the system based on this study.

2. The Navy Housing Program

Since 1782, Congress has been authorizing housing for members of the U.S. Armed Forces. 1866 saw the recognition of members' families needs; World War I brought about quarters allowance to enlisted personnel. World War II resulted in a huge buildup of housing units, but most were substandard or temporary in nature. After World War II, however, the impetus for ongoing steadily funded housing for military personnel was recognized. Various programs have come and gone since then and today there are approximately 400,000 units in the DoD housing inventory. Of these, approximately 70,000 units are in the Navy inventory.

The program manager for the Navy Family Housing Program is Commander, Naval Facilities Engineering (COMNAVFACENGCOM). This office provides centralized guidance and coordination for all the management aspects of family housing. The five Engineering Field Divisions (EFD) represent COMNAVFACENGCOM to provide closer liaison, more accessible management and technical guidance to the individual housing activities. These EFD's are located in Honolulu, San Francisco, Philadelphia, Norfolk, and Charleston. Figure 1 demonstrates the resource and policy flow.

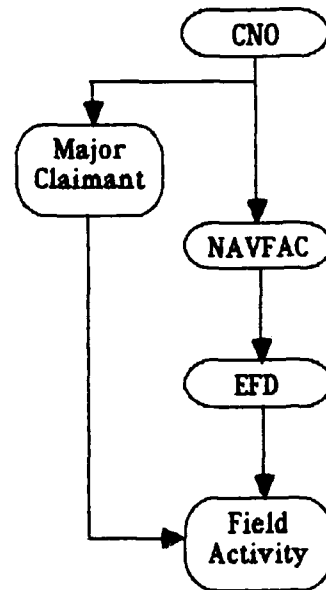


Figure 1
Policy Flow in Navy Housing

The divisional organization of NAVFACENGCOM encompasses all aspects of that responsibility to maintain policy continuity and enforcement. The housing division of the Facilities Management Department is responsible for promulgating NAVFAC policy on housing to the individual activities in its zone of control. The housing division internal organization is shown in Figure 2.

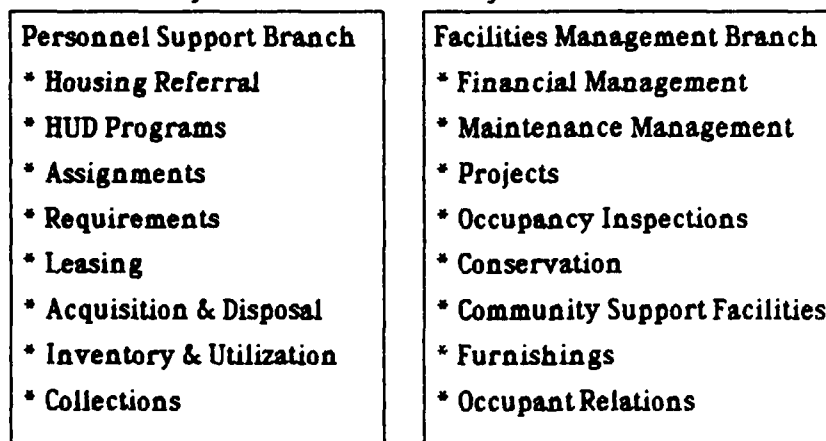


Figure 2
Housing Activity Internal Organization

against projected requirements. Discrepancies are recorded for the housing activity's reevaluation. The adjusted budget proposal is approved and forwarded to the EFD.

SOURCE/DESTINATION

INPUT: Adjusted Budget Proposal

Module 1.2.1.1.3

OUTPUT: Discrepant Budget Proposal
Approved Budget Proposal

Module 1.2.1.1.2
Budget Data
Engineering Field Division

NAME: RECEIVE APPROVED FUNDS

IDENTIFIER: 1.2.1.1.5

DESCRIPTION: This function receives the funded amounts that have been allocated to the activity and initiates the budget execution function (1.2.1.2).

SOURCE/DESTINATION

INPUT: Funded Budget

Comptroller Office

OUTPUT: Categorized Approved Funds

Budget Data

areas needing greater or lesser funding are then documented. The budget proposal is formalized and the future requirements for funding to meet the operations and maintenance plan are added to each budget element of the budget proposal.

SOURCE/DESTINATION

INPUT: Baseline Budget	Module 1.2.1.1.1
Operations Plan	Housing Office
Maintenance Plan	Housing Office
Discrepant Budget Proposal	Module 1.2.1.1.4
Pending Maintenance Requests	Planning Maintenance Data
Student Load Projections	Registrar

OUTPUT: Projected Budget Proposal	Module 1.2.1.1.3
-----------------------------------	------------------

NAME: APPLY EFD BUDGET CONSTRAINTS

IDENTIFIER: 1.2.1.1.3

DESCRIPTION: This function applies constraints as listed in the EFD Budget Request Document to the projected budget proposal. Illustrative of this function is the application of the approved inflation factor and the reevaluation of projected needs due to ceiling limitations of specific budget elements. The function produces an adjusted budget proposal.

SOURCE/DESTINATION

INPUT: Projected Budget Proposal	Module 1.2.1.1.2
EFD Budget Request Document	Engineering Field Division

OUTPUT: Adjusted Budget Proposal	Module 1.2.1.1.4
----------------------------------	------------------

NAME: REVIEW BY AFFECTED PARTIES

IDENTIFIER: 1.2.1.1.4

DESCRIPTION: This function is an evaluation of the budget proposal by functional areas outside the housing activity which are affected by this proposal. The request is evaluated for proper submission and incorporated into base budget data. Budgeted amounts are validated against the services to be performed. Adequate funds are allocated

D. OPERATE ACTIVITY FUNCTIONAL DECOMPOSITION

1. Prepare Budget Functions Decomposition

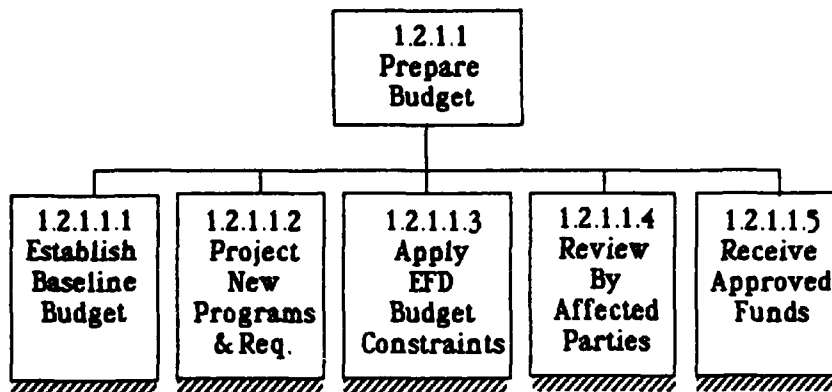


Figure 7
Prepare Budget Structure Chart

NAME: ESTABLISH BASELINE BUDGET

IDENTIFIER: 1.2.1.1.1

DESCRIPTION: This function evaluates past fiduciary needs and performance to establish a baseline for budget preparation. A baseline budget is produced from this data.

SOURCE/DESTINATION

INPUT: Engineering Field Division
Budget Request
Historical Budget Data

Engineering Field Division
Budget Data

OUTPUT: Baseline Budget

Module 1.2.1.1.2

NAME: PROJECT NEW PROGRAMS AND REQUIREMENTS

IDENTIFIER: 1.2.1.1.2

DESCRIPTION: This function utilizes the operations and maintenance plans to ascertain the future fiduciary needs for each budget element. Those

Figure 6
Maintain Activity Data Flow Diagram

NAME: UPDATE UNIT HISTORY

IDENTIFIER: 1.1.6

DESCRIPTION: This function evaluates the work completed by task category.
The task is then entered by category to the appropriate record that
updates Unit History data.

SOURCE/DESTINATION

INPUT: Work Performed

Module 1.1.5

OUTPUT: Categorized Tasks

Unit History Data

NAME: VERIFY FUNDS AVAILABILITY

IDENTIFIER: 1.1.4

DESCRIPTION: This function verifies that funds are not over-obligated. The RFC cost is compared to the recorded balance of budgeted dollars remaining. The RFC is then authorized or rejected, depending on this comparison.

SOURCE/DESTINATION

INPUT: Formal Request for Const.

Module 1.1.3

OUTPUT: Authorized Request for Const.
Rejected Request for Const.

Resident Officer in Charge
Module 1.1.3

NAME: EXECUTE WORK

IDENTIFIER: 1.1.5

DESCRIPTION: This function completes the required work based on the input information. The appropriate quantity and type of resources for task accomplishment are expended, bounded by the written estimates. As the work is performed, the appropriate expenditures are maintained.

SOURCE/DESTINATION

INPUT: Work Order
Awarded Contract
Recurring Job Order
Material Data

Maintenance Department
Resident Officer-in-Charge
Module 1.1.1
Inventory

OUTPUT: Categorized Costs
Contract Bid

Module 1.2.1.2.2
Module 1.2.1.2.2

Specific Maintenance Request	Module 1.1.2
Request for Construction(RFC)	Module 1.1.2
Emergency/Service Request	Maintenance Shop
Recurring Job Order	Module 1.1.5

NAME: ESTIMATE JOB

IDENTIFIER: 1.1.2

DESCRIPTION: This function establishes an estimate of the RFC or specific maintenance requests based on expert knowledge. The skill level required for the request is evaluated, manhours required are estimated, and overall cost for materials is annotated on the request.

SOURCE/DESTINATION

INPUT: Request for Construction(RFC)	Module 1.1.1
Specific Maintenance Request	Module 1.1.1

OUTPUT: Work Auth./Estimate (specific)	Module 1.1.3
Request for Const. Valuation	Module 1.1.3

NAME: REVIEW ESTIMATE

IDENTIFIER: 1.1.3

DESCRIPTION: This function compares the work estimate to known data on funds availability, job priority, and the valuation of the request. A decision is then made as to whether the maintenance will be executed. The estimate is approved and forwarded, or rejected.

SOURCE/DESTINATION

INPUT: Work Auth./Estimate	Module 1.1.2
Request for Const. Valuation	Module 1.1.2
Historical Budget Data	Budget Data

OUTPUT: Formal Request for Const.	Module 1.1.4
Authorized Work Auth./Estimate	Maintenance Department
Rejected Estimate	Module 1.1.1

C. MAINTAIN ACTIVITY FUNCTIONAL DECOMPOSITION

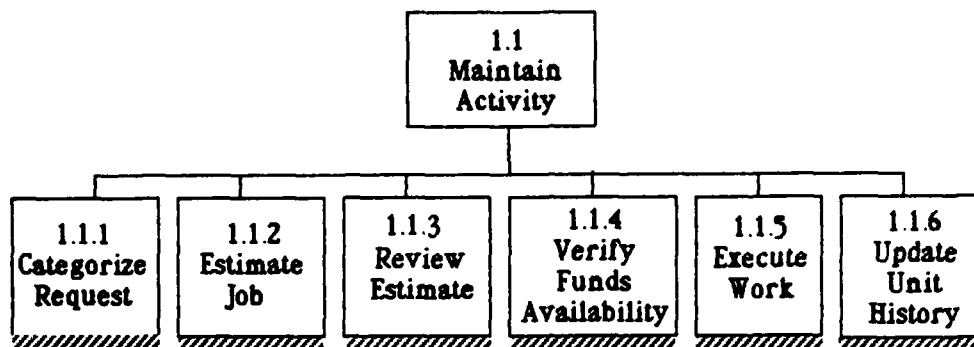


Figure 5
Maintain Activity Structure Chart

NAME: CATEGORIZE REQUEST

IDENTIFIER: 1.1.1

DESCRIPTION: This function evaluates all requests for feasibility, number of man-hours required, the approximate overall cost, and the priority of work execution. This is accomplished by comparison to past similar jobs. The function assigns a category of work as emergency/service (routine), recurring, or specific (non-routine). If the request is large in scope or beyond the local maintenance capabilities, a fourth category, request for construction, is assigned. Appropriate paperwork is then completed and forwarded. Estimates of any past processed requests are re-evaluated to determine if the request can be changed to make it acceptable or to place it into the planning maintenance data for future consideration.

SOURCE/DESTINATION

INPUT: Maintenance Requests

Rejected Estimate
Budget Balance Data
Moveout Maintenance Requirement
Tentative Plan of Action

Housing Activity
Inspectors
Occupants
Module 1.1.3
Budget Data
Module 1.3.3.5
Module 1.2.3.4

OUTPUT: Rejected Request

Planning Maintenance Data

NAME: OPERATE ACTIVITY

IDENTIFIER: 1.2

DESCRIPTION: This function maintains the budget, sustains all operational supplies, conserves utilities, and sustains the furnishings inventory. The inventory duties include both tracking and maintaining adequate numbers of inventory items.

NAME: HANDLE OCCUPANT NEEDS

IDENTIFIER: 1.3

DESCRIPTION: This function identifies the interactions of the housing office with those persons who request assignment to, are assigned to, or request termination from the housing activity.

B. HIGH LEVEL FUNCTIONAL DECOMPOSITION

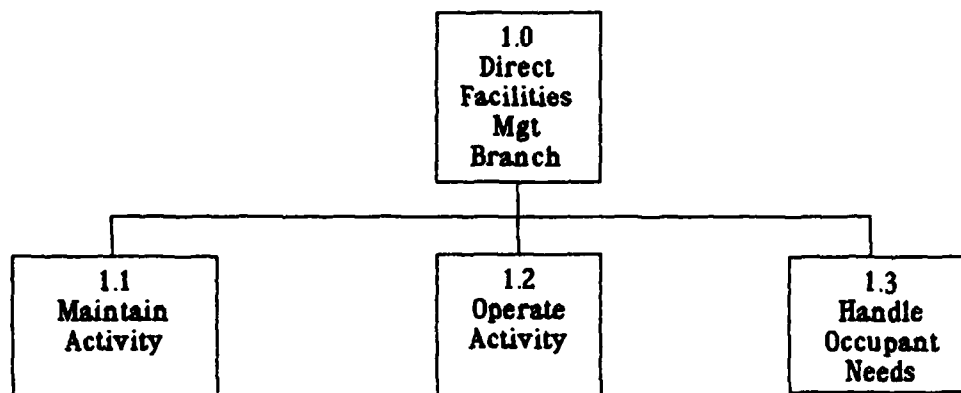


Figure 4
High Level Structure Chart

NAME: DIRECT FACILITIES MANAGEMENT BRANCH

IDENTIFIER: 1.0

DESCRIPTION: This function maintains all facilities assigned to the activity, operates the activity, and handles occupant needs.

NAME: MAINTAIN ACTIVITY

IDENTIFIER: 1.1

DESCRIPTION: This function plans, programs, budgets, and executes the activity's maintenance program. This includes all upkeep, repair and replacement of any facility or item assigned to the activity.

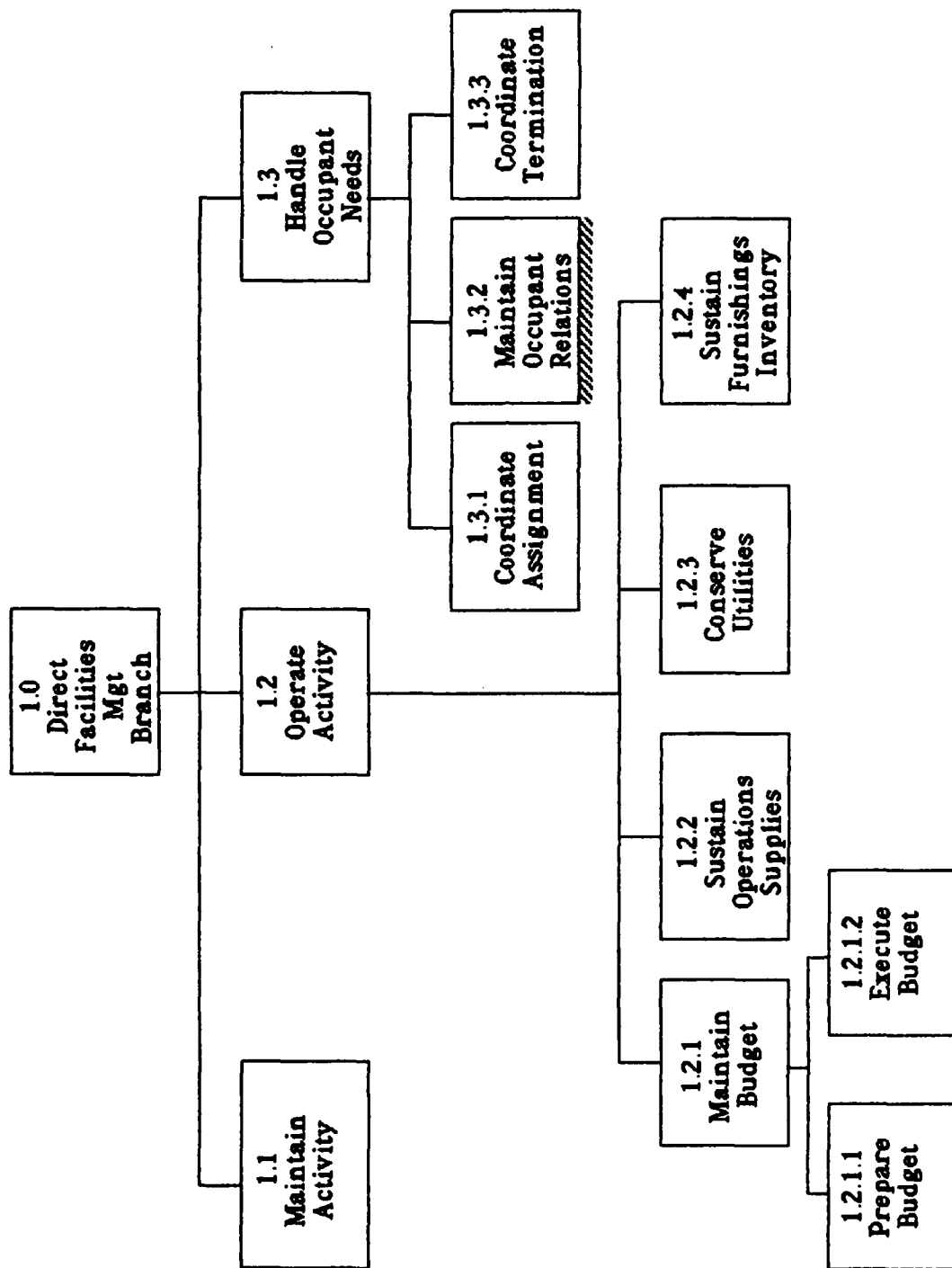


Figure 3
Housing Activity Hierarchical Function Chart

and automated systems in place have not been presented in this logical model. An attempt to name functions and processes consistently and accurately has been made to help the reader better understand the system. To aid in function definition and to validate a particular level, the next lower level of functions are described. The function description consists of a name, a unique identifier, a descriptive narrative, and the inputs and outputs that are required.

The functional description format is a structure chart of the function including the next lowest level, a narrative description, and (for the lowest level functions only) a data flow diagram.

The following descriptions are for high level functions. Because each high level function is subsequently broken into lower level functions, the descriptions are broad. Lower level functions will be described in more detail.

This organization of management functions is identical to those at the field activity. This standardized organization structure has been implemented to provide an optimum level of service and to enhance inter-and-intra-staff effectiveness. Those items under the Personnel Support Branch deal with satisfying housing requirements while those under the Facilities Management Branch deal with maintaining property and equipment, operating the activity in an effective and efficient manner, and responding to occupant needs.

The Facilities Management Branch, although divided into eight organizational areas, can be functionally divided into three areas: maintenance, operations, and occupant relations. Figure 3 is a hierarchical functional chart for the facilities management branch.

The La Mesa Housing Project, Naval Postgraduate School, began operation in 1951 in conjunction with the purchase of the Del Monte Hotel which was obtained as a new campus for the Naval Postgraduate School. The housing project began with the purchase of 14 housing units located on the grounds of the hotel. In 1951 Congress approved funding for the acquisition of an additional 449 housing units to support the school's student body. From 1961 through 1969 an additional 428 units were added to the housing project. Today the La Mesa Project encompasses 891 housing units on 300 acres, serves 1500 service members, and requires a \$3.5 million dollar annual budget. This housing activity is the source of information for this thesis.

Each of the major functions will be hierarchically decomposed into subfunctions and described in more detail. Current organizational structure

2. Execute Budget Functions Decomposition

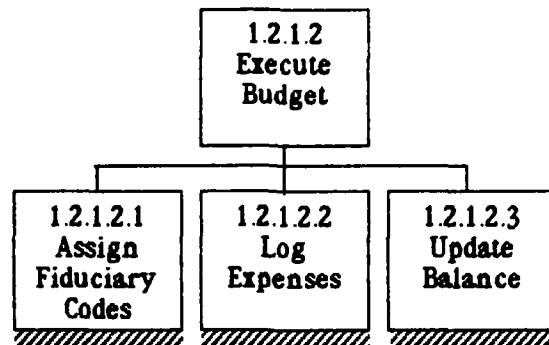


Figure 9
Execute Budget Structure Chart

NAME: ASSIGN FIDUCIARY CODES

IDENTIFIER: 1.2.1.2.1

DESCRIPTION: This function evaluates the cost source, assigns the cost originator data, and assigns a unique Original Document Code to the cost. The accounting data is noted on the document.

SOURCE/DESTINATION

INPUT: Labor and Material Costs
Requisition
Bid
Bill
Budget Balance

Maintenance Shop
Supply Department
Contractors
Utility Companies
Budget Data

OUTPUT: Notated/Categorized Cost

Module 1.2.1.2.2

NAME: LOG EXPENSES

IDENTIFIER: 1.2.1.2.2

DESCRIPTION: This function takes the data and logs it into the budget data in accepted accounting format and methodology.

SOURCE/DESTINATION

INPUT: Notated/Categorized Cost

Module 1.2.1.2.1

OUTPUT: Categorized Cost Data

Budget Data

NAME: UPDATE BALANCE

IDENTIFIER: 1.2.1.2.3

DESCRIPTION: This function debits funds from the appropriate funds category. The balance is figured and recorded. This balance for the cost category is continually monitored to ensure that sufficient funds are maintained. Any unusual circumstances affecting funds such as funds cuts or reprogramming are accomplished. Costs are aggregated for reporting puposes.

SOURCE/DESTINATION

INPUT: Budget Data

Budget Data

OUTPUT: Manipulated Budget Data

Comptroller
Budget Data

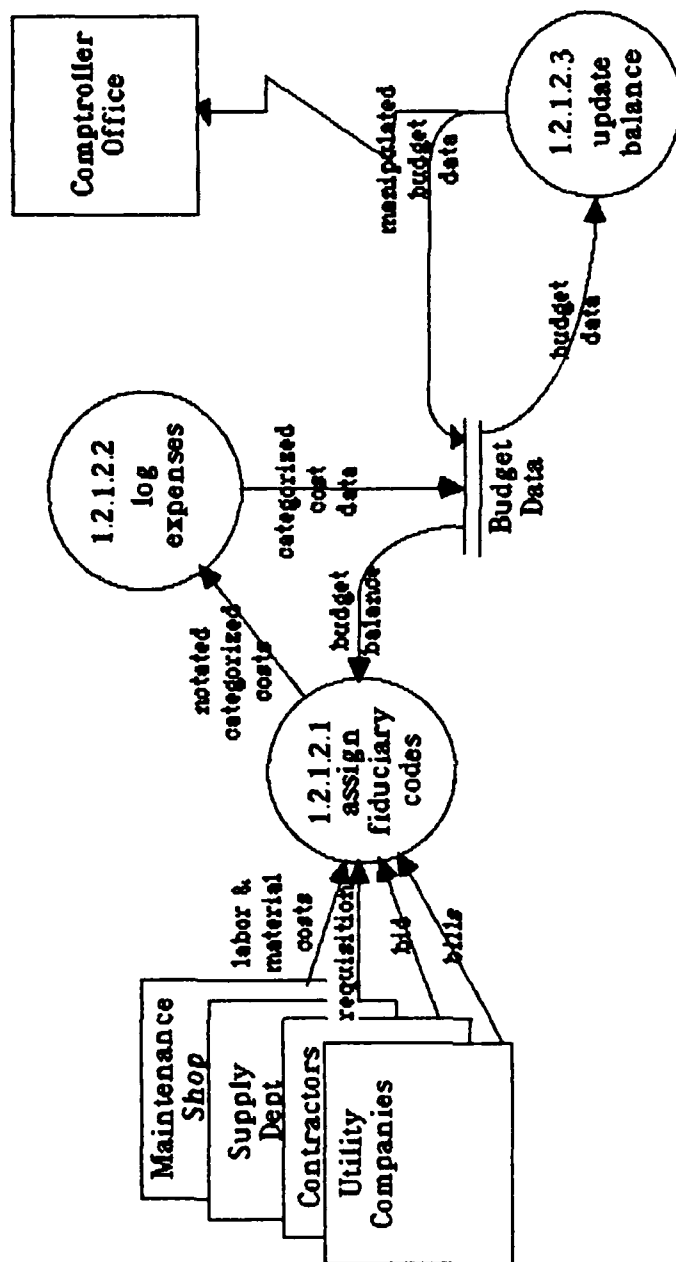


Figure 10
Execute Budget Data Flow Diagram

3. Sustain Operations Supplies Functions Decomposition

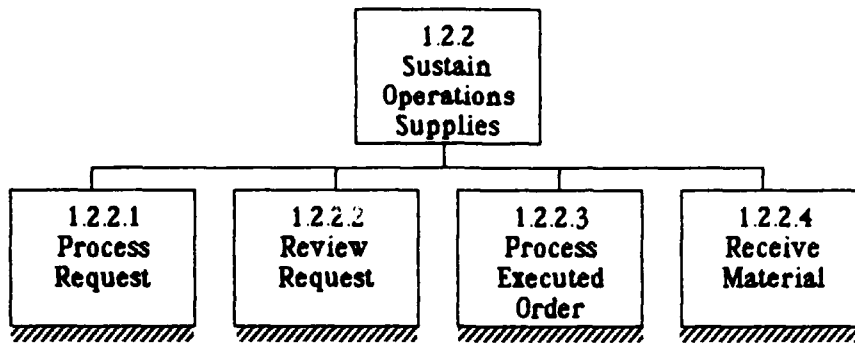


Figure 11
Sustain Operations Supplies Structure Chart

NAME: PROCESS REQUEST

IDENTIFIER: 1.2.2.1

DESCRIPTION: This function evaluates the housing activity material request to determine the appropriate source from which to fulfill the request. Documentation is prepared for the internal material requisition order (Ready Supply). Documentation is prepared for the external material requisition order.

SOURCE/DESTINATION

INPUT: Material Request	Housing Activity
Inventory Request	Module 1.2.4.2
OUTPUT: Internal Material Requisition Order	Module 1.2.2.4
External Material Requisition Order	Module 1.2.2.2

NAME: REVIEW REQUEST

IDENTIFIER: 1.2.2.2

DESCRIPTION: This function categorizes the material requisition order by accounting data (budget project, budget line code) and then evaluates the cost(s) of the requested material to ascertain the funds status of the requested item(s). A determination as to rejection or acceptance of the request is then made.

SOURCE/DESTINATION

INPUT: External Material Requisition
Order

Module 1.2.2.1

OUTPUT: Approved Material Requisition
Order
Rejected Material Requisition
Order

Supply Department

Housing Activity

NAME: PROCESS EXECUTED ORDER

IDENTIFIER: 1.2.2.3

DESCRIPTION: This function evaluates the cost(s) of the requested material as noted on the order in process. Variations in cost, quantity, or type of material are noted.

SOURCE/DESTINATION

INPUT: Order in Process

Supply Department

OUTPUT: Cost Obligations

Module 1.2.1.2.2

NAME: RECEIVE MATERIAL

IDENTIFIER: 1.2.2.4

DESCRIPTION: This function performs the physical receipt of the ordered materials. Receipt paperwork is validated against actual receipt and

the inventory records are updated. Those parties that ordered the material are notified. Internal ordered supplies are received directly.

SOURCE/DESTINATION

INPUT: Material Receipt Notification
Internal Material Requisition
Order

Supply Department

Module 1.2.2.1

OUTPUT: Material
Internal Material Requisition
Order Cost(s)

Inventory Warehouse

Module 1.2.1.2.2

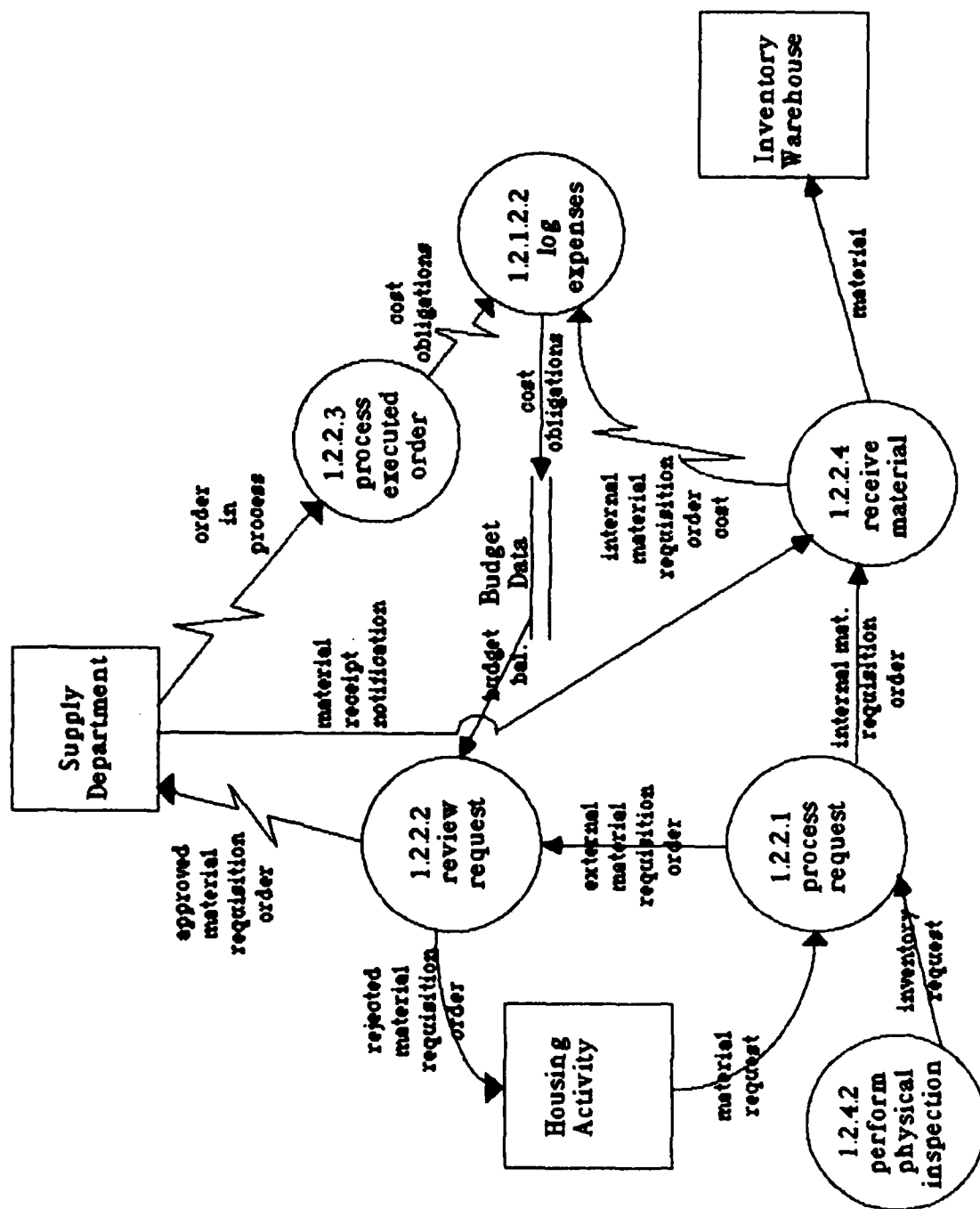


Figure 12
Sustain Operations Supplies Data Flow Diagram

4. Conserve Utilities Functions Decomposition

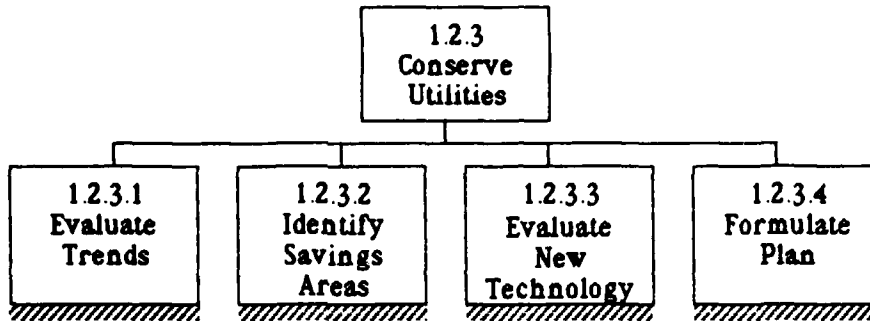


Figure 13
Conserve Utilities Structure Chart

NAME: EVALUATE TRENDS

IDENTIFIER: 1.2.3.1

DESCRIPTION: This function aggregates historical utilities costs and performs statistical consumption trend analysis.

SOURCE/DESTINATION

INPUT: Historical Utility Data

Budget Data

OUTPUT: Statistical Trend Data

Module 1.2.3.2

NAME: IDENTIFY SAVINGS AREAS

IDENTIFIER: 1.2.3.2

DESCRIPTION: This function examines Naval Facilities Command policies, utility company surveys and the statistical trend data to find those areas not in keeping with accepted consumption policies. The Property Account and Unit History Data is studied for trends of age, inadequacies, or failure that may be a factor in unsatisfactory utility consumption.

SOURCE/DESTINATION

INPUT: Statistical Trend Data
Unit Data
Utility Surveys
Policies

Module 1.2.3.1
Unit History Data
Utility Companies
Naval Facilities Command

OUTPUT: Specific Categories for Savings Module 1.2.3.3

NAME: EVALUATE NEW TECHNOLOGY

IDENTIFIER: 1.2.3.3

DESCRIPTION: This function evaluates the scope of the identified category for savings. Research is conducted on the industry literature to determine possible new technologies or methods for saving. Approximate estimates are established and program scope is decided.

SOURCE/DESTINATION

INPUT: Specific Categories for Savings
New Technology Data

Module 1.2.3.2
Industry Literature

OUTPUT: Savings Requirement Solutions Module 1.2.3.4

NAME: FORMULATE PLAN

IDENTIFIER: 1.2.3.4

DESCRIPTION: This function estimates the initial cost for the solution. Cost benefit studies are undertaken. A priority is assigned to project and the plan enters the Maintain Activity (1.1) interface.

SOURCE/DESTINATION

INPUT: Savings Requirement Solutions

Module 1.2.3.3

OUTPUT: Tentative Plan Of Action

Module 1.1

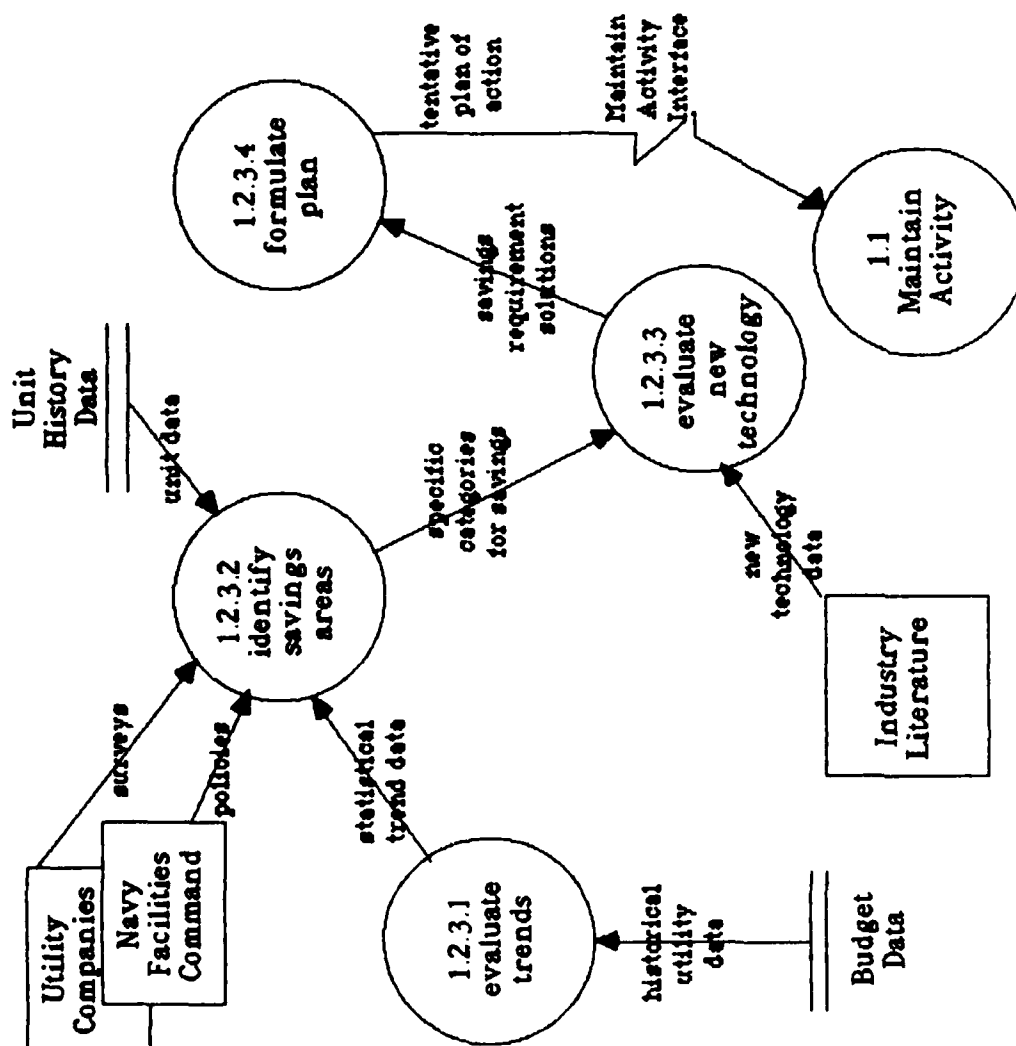


Figure 14
Conserve Utilities Data Flow Diagram

5. Sustain Furnishings Functions Decomposition

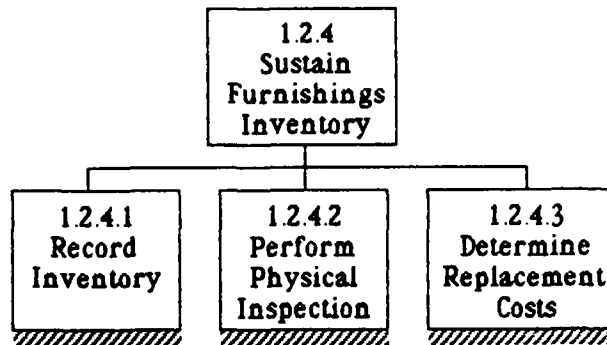


Figure 15
Sustain Furnishings Inventory Structure Chart

NAME: RECORD INVENTORY

IDENTIFIER: 1.2.4.1

DESCRIPTION: This function evaluates past orders to aggregate like items. The inventory for the warehouse is checked against this aggregate. Past maintenance requirements utilizing the inventory are taken from the budget data and integrated into this list. The final product is the recorded inventory.

SOURCE/DESTINATION

INPUT: Quantitative Data

Unit Data
Budget Data

Warehouse
Units
Unit History File
Budget Data

OUTPUT: Recorded Inventory

Module 1.2.4.2

NAME: PERFORM PHYSICAL INSPECTION

IDENTIFIER: 1.2.4.2

DESCRIPTION: This function performs an on-site physical inspection of warehouse inventory and vacant units to evaluate accuracy of the inventory record. Discrepancies are noted for further action. A verified inventory is then written. Short supplies of consummables are noted and a supply request will be initiated.

SOURCE/DESTINATION

INPUT: Recorded Inventory	Module 1.2.4.1
OUTPUT: Internal Supply Request	Module 1.2.2
Verified Inventory	Module 1.2.4.3

NAME: DETERMINE REPLACEMENT COSTS

IDENTIFIER: 1.2.4.3

DESCRIPTION: This function differentiates items that are replaceable versus consummable. An example would be a stove versus paper products. The present year replacement value is researched and noted for each item and total worth. Shortfalls in inventory are noted for replaceables and a supply request is issued. Future replacement is projected and these needs are communicated to the Housing Office.

SOURCE/DESTINATION

INPUT: Verified Inventory	Module 1.2.4.2
Accepted Replacement Values	GAO
OUTPUT: Inventory Replacement Data	Housing Activity
External Supply Request	Module 1.2.2
Inventory Value/Quantities	Public Works Inventory

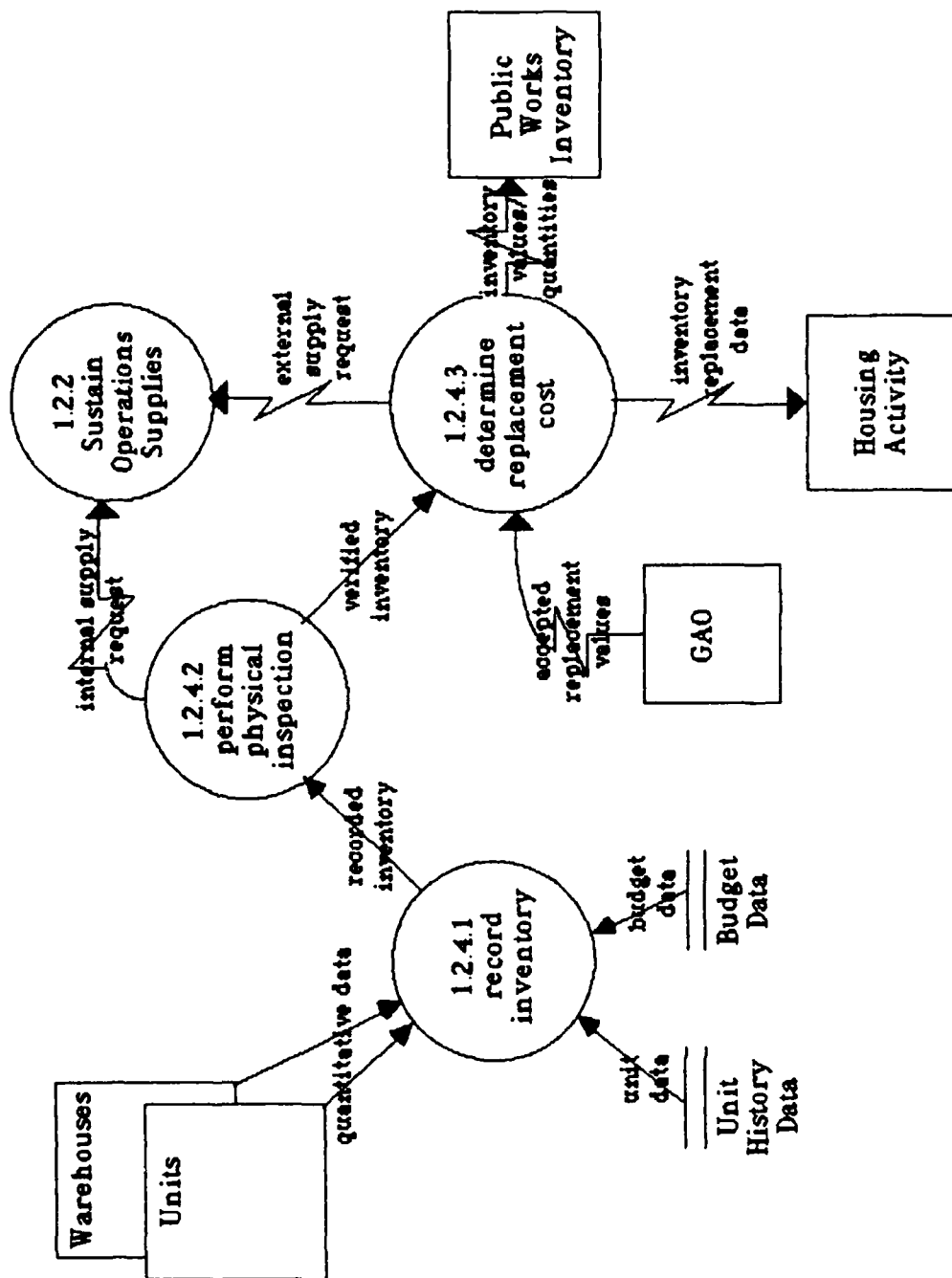


Figure 16
Sustain Furnishings Inventory Data Flow Diagram

E. HANDLE OCCUPANTS NEEDS FUNCTIONAL DECOMPOSITION

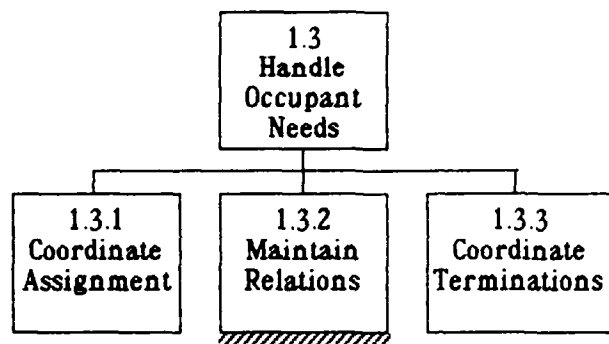


Figure 17
Handle Occupant Needs Structure Chart

NAME: COORDINATE ASSIGNMENT

IDENTIFIER: 1.3.1

DESCRIPTION: This function processes personnel information required to allow potential assignment to family housing. Eligibility is determined and a position on an appropriate waiting list is assigned. Once an appropriate unit becomes available for occupancy, it will be offered for member inspection. If a member rejects two consecutive selections, he is removed from the list and must reapply for housing. If either unit is chosen, the unit is assigned to that member and upon move-in, a check-in inspection will be held to mutually ascertain the condition of the unit at move-in.

NAME: MAINTAIN OCCUPANT RELATIONS

IDENTIFIER: 1.3.2

DESCRIPTION: Occupant relations programs are designed to promote an amicable atmosphere among occupants and a close relationship between the occupants and the housing organization. The activity maintains and is responsible to make each occupant aware of local regulations and situations. This module incorporates intangibles such as an orientation plan, "town hall" meetings and other communication vehicles between the activity and its occupants. This area will not be

Element name : Address

Format : alphanumeric

Size : 50

Description : The address the Housing Availability Form DD 1747 is to be sent upon receipt of the application for housing.

Element name : Rank/Rate

Format : alphanumeric

Size : 6

Description : The military rank of officer members or the military rate of enlisted members applying or residing at the housing activity.

Element name : Social security number

Format : numeric

Size : 9

Description : The unique, Federally assigned Social security number of the member.

Element name : Date of rank

Format : numeric

Size : 6 (MMDDYY)

Description : The date when the member is considered for promotion.

Element name : Effective date of change in duty station

Format : numeric

Size : 6 (MMDDYY)

Description : The estimated date the member will depart his last permanent duty station.

Element name : Total number in family

Format : numeric

Size : 2

Description : The total number of dependents, not including the member.

Element name : Spouse

Format : alphabetic

Size : 3

Description : An indicator as to the marital status.

Element name : Date of birth, male children

Format : numeric

Size : 6 (MMDDYY)

Description : The birthdates of male children to reside with the member.

First name
 Middle initial
 Address
 Rank/Rate
 Social security number SSN
 Date of rank
 Effective date of change of duty station Rotation date, Detachment date
 Total number in family
 Spouse Wife, Husband
 Date of Birth, male children
 Date of birth, female children
 Other dependents, number
 Other dependents, sex
 Other dependents, relationship
 Other dependents, ages
 Other dependents, dependency authority
 Not-on-waiting list explanation
 Temporary telephone number
 Telephone number
 Date of assignment
 Projected rotation date PRD
 Pre-termination date
 Termination date
 Next permanent duty station
 Signature

Element name : Installation name
 Format : alphanumeric
 Size : 25
 Description : The installation to which the member is being assigned.

Element name : Last name
 Format : alphabetic
 Size : 15
 Description : The legal last name of the member.

Element name : First name
 Format : alphabetic
 Size : 15
 Description : The legal first name of the member.

Element name : Middle initial
 Format : alphabetic
 Size : 2
 Description : The middle initial(s) of the member.

II. HOUSING ACTIVITY FACILITIES MANAGEMENT BRANCH DATA DICTIONARY

This section defines the data utilized by the Housing Office. The purpose of a data dictionary is to form a central repository of data about data used in the system. The data dictionary format that follows will consist of the entity name followed by a description. Below it will be a list of elements describing that entity and to the right of the element, any aliases that may apply to the element. Each entity will then be addressed individually to include, as applicable:

Element Name : (full and proper name)

Format : (alphabetic, mixed, or numeric)

Size : (normal character length)

Description : (brief discussion of what the element is).

The entities are Member, Application, Waiting List, Inventory, Unit, Maintenance, Requisition, and Funds.

A. MEMBER ENTITY

Entity name : Member

Aliases : Applicant, Occupant

Description : A person who submits an application for housing, presently resides in a housing activity facility, or is in the process of terminating his or her commitment to the housing activity.

Elements :

Aliases :

Installation name
Last name

Duty station, Parent Command

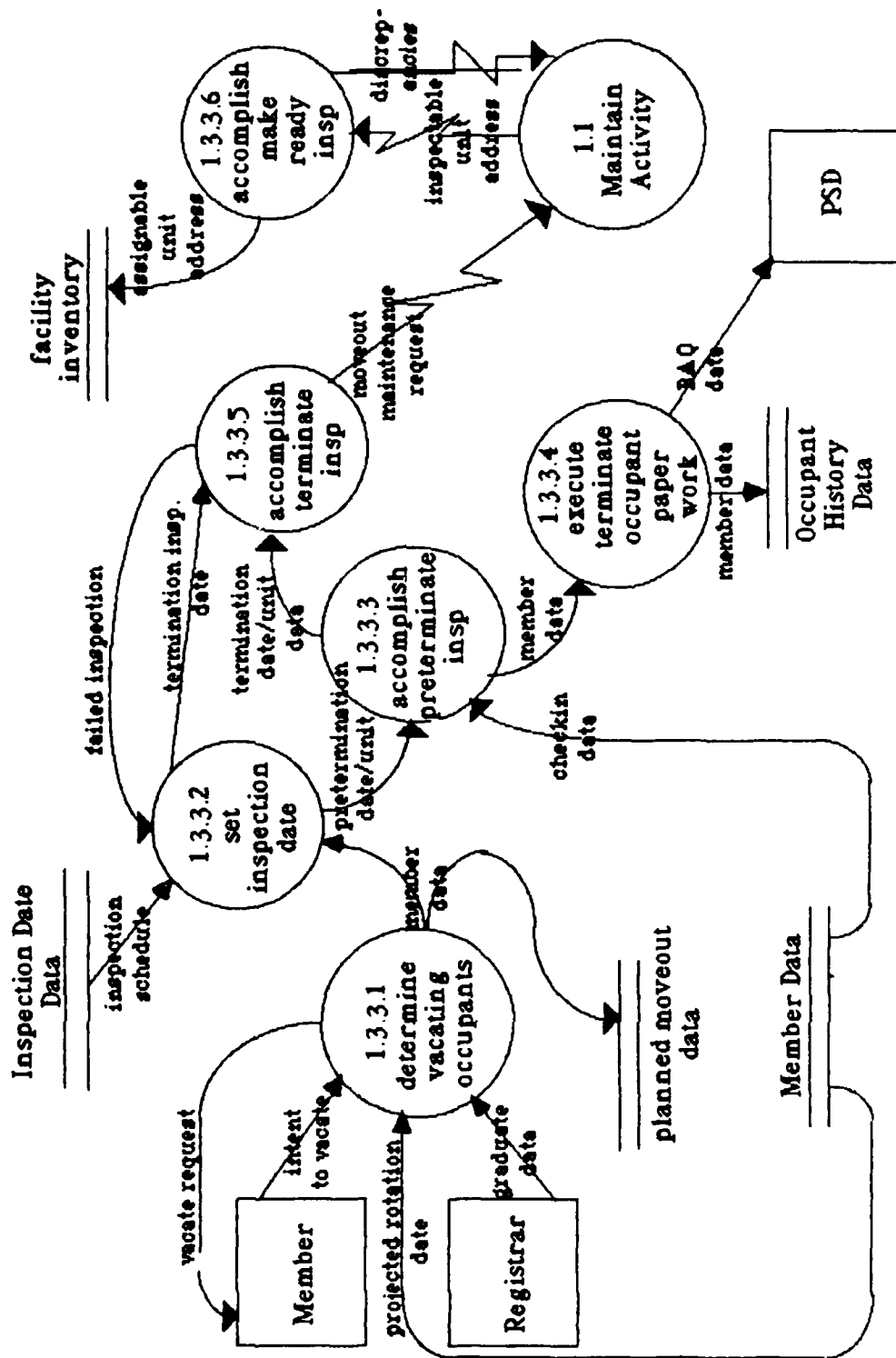


Figure 21
Coordinate Termination Data Flow Diagram

NAME: ACCOMPLISH MAKE-READY INSPECTION

IDENTIFIER: 1.3.3.6

DESCRIPTION: This function evaluates on-site condition after maintenance to ensure completion and to inspect overall condition. Once satisfactory, the unit is released for assignment.

SOURCE/DESTINATION

INPUT: Inspectable Unit Address

Module 1.1

OUTPUT: Assignable Unit Address
Discrepancies

Facility Inventory
Module 1.1

NAME: EXECUTE TERMINATE OCCUPANT PAPERWORK

IDENTIFIER: 1.3.3.4

DESCRIPTION: This function executes reinstatement of BAQ based on date of detachment. The occupant data is removed from active occupant data. Member data is moved to occupant history data.

SOURCE/DESTINATION

INPUT: Member Data

Module 1.3.3.3

OUTPUT: BAQ Data
Member Data

PSD
Occupant History Data

NAME: ACCOMPLISH TERMINATION INSPECTION

IDENTIFIER: 1.3.3.5

DESCRIPTION: This function accomplishes the termination inspection after all personal effects have been removed. State of cleanliness, discrepancy rectification as noted in the pre-termination inspection, and moveout maintenance requirements are noted. If found acceptable, the member is released from any further responsibility to the housing activity. If not, the member must reschedule another termination inspection date after the discrepancies are rectified.

SOURCE/DESTINATION

INPUT: Unit Data
Termination Inspection Date

Module 1.3.3.3
Module 1.3.3.2
Module 1.3.3.3

OUTPUT: Moveout Maintenance Request

Module 1.1

NAME: SET INSPECTION DATE

IDENTIFIER: 1.3.3.2

DESCRIPTION: This function evaluates the pre-termination dates available and assigns one that is mutually satisfactory to the occupant and the housing inspectors.

SOURCE/DESTINATION

INPUT: Inspection Schedule	Inspection Date Data
Member Data	Module 1.3.3.1
Failed Inspection	Module 1.3.3.5
OUTPUT: Pre-termination Inspection Date/	
Unit	Module 1.3.3.3
Termination Inspection Date	Module 1.3.3.5

NAME: ACCOMPLISH PRE-TERMINATION INSPECTION

IDENTIFIER: 1.3.3.3

DESCRIPTION: This function accomplishes an on-site inspection of the unit with the member. Discrepancies between unit condition at move-out and condition at the check-in inspection are recorded. Evaluate the unit for move-out maintenance requirements and set a termination inspection date.

SOURCE/DESTINATION

INPUT: Pre-termination Inspection Date	Module 1.3.3.2
Check-in Data	Member Data
Unit	Module 1.3.3.2
OUTPUT: Termination Inspection Date	Module 1.3.3.5
Unit data	Module 1.3.3.5
Member Data	Module 1.3.3.4

2. Coordinate Termination Functions Decomposition

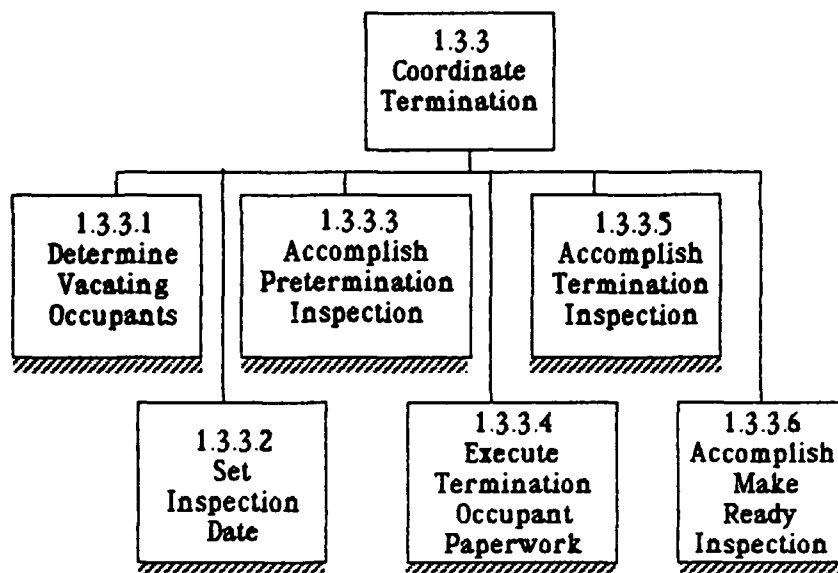


Figure 20
Coordinate Termination Structure Chart

NAME: DETERMINE VACATING OCCUPANTS

IDENTIFIER: 1.3.3.1

DESCRIPTION: This function evaluates the intent to vacate forms submitted and cross references the graduating class roster sent to the activity by the registrar. Records are inspected to validate occupants that will be leaving the command within a minimum of 30 days. Enter all validated occupant/unit information into planned moveout data.

SOURCE/DESTINATION

INPUT: Intent to Vacate
Graduate Data
Projected Rotation Date

Member
Registrar
Member Data

OUTPUT: Member Data
Vacate Request

Module 1.3.3.2
Planned Moveout Data
Member

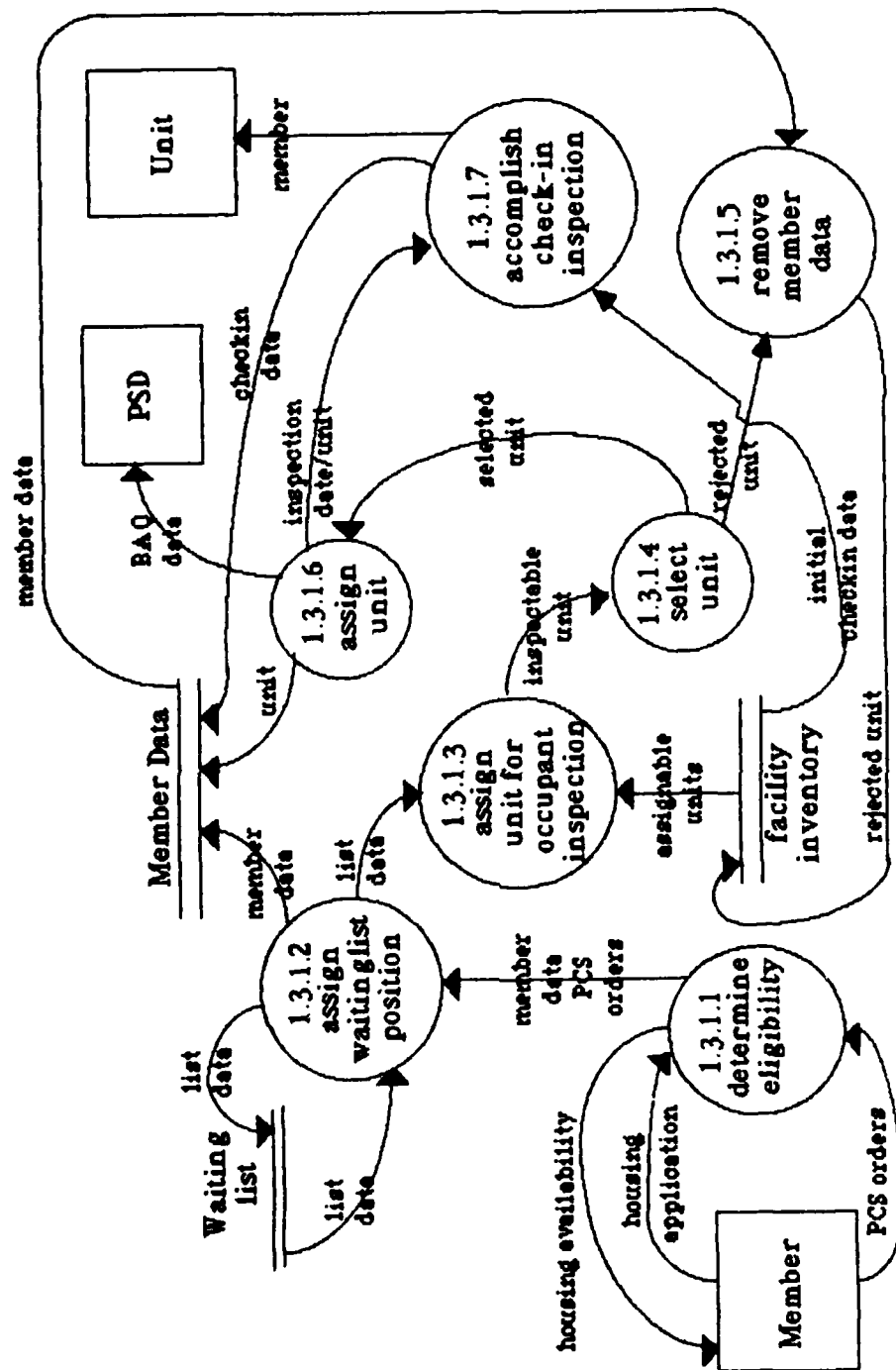


Figure 19
Coordinate Assignment Data Flow Diagram

NAME: ACCOMPLISH CHECK-IN INSPECTION

IDENTIFIER: 1.3.1.7

DESCRIPTION: This function accomplishes an inspection with the member to record the condition of the unit, verify unit inventory, condition, operation and identification numbers of the unit inventory. The member is informed of all rules and regulations pertaining to occupancy.

SOURCE/DESTINATION

INPUT: Inspection Date/Unit
Initial Check-in Data

Module 1.3.1.5
Facility Inventory

OUTPUT: Check-in Data

Member Data

the unit(s). The activity will either assign the unit to the member or remove the person from the waiting list and from the occupant data.

SOURCE/DESTINATION

INPUT: Inspectable Unit

Module 1.3.1.3

OUTPUT: Selected Unit
Rejected Unit

Module 1.3.1.6
Module 1.3.1.5

NAME: REMOVE MEMBER DATA

IDENTIFIER: 1.3.1.5

DESCRIPTION: Upon notification of two rejections, the member's data is removed from the occupant data, and removed from the appropriate waiting list. The rejected units are released for reassignment.

SOURCE/DESTINATION

INPUT: Rejected Unit
Member Data

Module 1.3.1.4
Member Data

OUTPUT: Rejected Unit

Facility Inventory

NAME: ASSIGN UNIT

IDENTIFIER: 1.3.1.6

DESCRIPTION: This function assigns a unit to the member. Keys and rules are issued. BAQ termination papers are processed effective the day of assignment. A check-in inspection date is assigned.

SOURCE/DESTINATION

INPUT: Selected Unit

Module 1.3.1.4

OUTPUT: BAQ Data
Inspection Date/Unit
Unit

Personnel Support Det.
Module 1.3.1.7
Member Data

NAME: ASSIGN WAITING LIST POSITION

IDENTIFIER: 1.3.1.2

DESCRIPTION: This function determines the position on the waiting list according to date of detachment. The member data is entered on the appropriate waiting list and a personnel file is opened for the member.

SOURCE/DESTINATION

INPUT: Member Data
PCS Orders
List Data

Module 1.3.1.1
Module 1.3.1.1
Waiting List

OUTPUT: Member Data
List Data

Member Data
Module 1.3.1.3
Waiting List

NAME: ASSIGN UNIT FOR OCCUPANT INSPECTION

IDENTIFIER: 1.3.1.3

DESCRIPTION: This function matches assignable units with eligible members on an appropriate waiting list. The top-positioned member is notified and a date and address for inspection is determined.

SOURCE/DESTINATION

INPUT: Assignable Units
List Data

Facility Inventory
Module 1.3.1.2

OUTPUT: Inspectable Unit

Module 1.3.1.4

NAME: SELECT UNIT

IDENTIFIER: 1.3.1.4

DESCRIPTION: The member evaluates the offered unit(s) to determine suitability. He then notifies housing of his decision to accept or reject

1. Coordinate Assignment Functions Decomposition

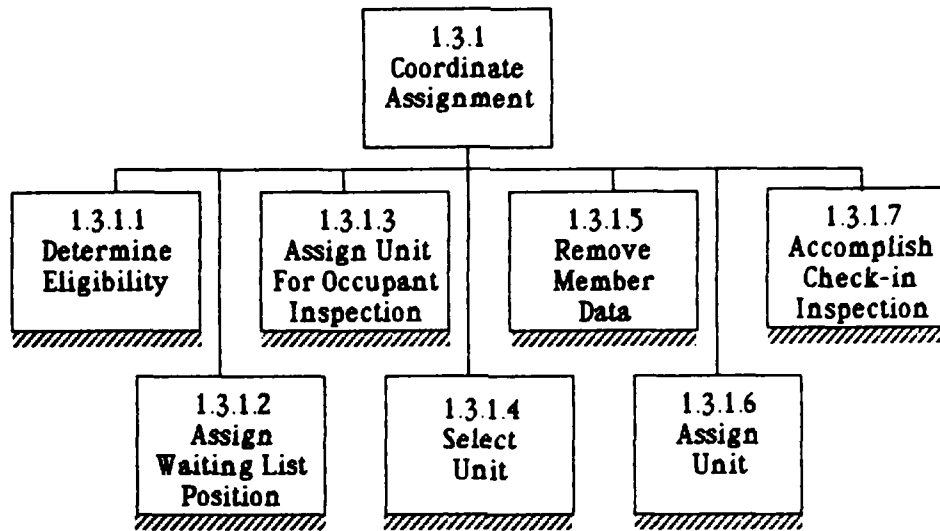


Figure 18
Coordinate Assignment Structure Chart

NAME: DETERMINE ELIGIBILITY

IDENTIFIER: 1.3.1.1

DESCRIPTION: This function evaluates the housing application for completeness. It is validated with appropriate personnel data to ensure the person is being ordered to a tenant activity under the activity's responsibility. A determination of quarters size and location eligibility is determined by family size and rank. A status of housing availability is then given to the applicant.

SOURCE/DESTINATION

INPUT: Housing Application
PCS Orders

Member
Member

OUTPUT: Housing Availability
Member Data
PCS Orders

Member
Module 1.3.1.2
Module 1.3.1.2

studied further because of its unstructured, human interactionary nature.

NAME: COORDINATE TERMINATION

IDENTIFIER: 1.3.3

DESCRIPTION: This function categorizes those occupants who desire or are required to move out. Upon determining vacating occupants, a pre-termination date is assigned. On the appointed date an inspection of the unit is performed. Termination paperwork is completed and after the occupant's personal effects have been removed, a termination inspection is completed. Maintenance requirements are sent through the maintenance management function and when completed, a make-ready inspection is performed. The unit is then released for assignment.

Element name : Date of birth, female children

Format : numeric

Size : 6 (MMDDYY)

Description : The birthdates of female children to reside with the member.

Element name : Other dependents number

Format : numeric

Size : 2

Description : The total number of other dependents falling into the same category of the next two elements (Other dependents sex and relationship) considered together.

Element name : Other dependents sex

Format : alphabetic

Size : 6

Description : The sex of other dependents.

Element name : Other dependents ages

Format : numeric

Size : 3

Description : The age of other dependents.

Element name : Other dependents dependency authority

Format : numeric

Size : 6 (MMDDYY)

Description : The date of approval of other dependents (found on the application for dependent identification cards, DD Form 137).

Element name : Not-on-waiting list explanation

Format : alphabetic

Size : 50

Description : The reasons and circumstances as to why the member is not on a waiting list.

Element name : Temporary telephone number

Format : numeric

Size : 10

Description : The telephone number the member can be reached at when a unit becomes available for inspection.

Element name : Telephone number

Format : numeric

Size : 11

Description : The telephone number of the member's home phone number.

Element name : Date of assignment

Format : numeric

Size : 6 (MMDDYY)

Description : The effective date of assignment when the member takes responsibility of that unit.

Element name : Projected rotation date

Format : numeric

Size : 6

Description : The date the individual is scheduled to leave the tenant command (installation name).

Element name : Pre-termination inspection date

Format : numeric

Size : 6 (MMDDYY)

Description : The assigned date at which time an inspector will inspect the unit with the member prior to moving out.

Element name : Termination inspection date

Format : numeric

Size : 6 (MMDDYY)

Description : The date the member will conduct a unit inspection with an inspector after personal affects have been moved out.

Element name : Next permanent duty station

Format : alphanumeric

Size : 50

Description : The address where the member can be reached after termination has been completed.

Element name : Signature

Format : alphabetic

Size : 25

Description : The full member name, in handwritten form, required for validating any requests.

B. APPLICATION ENTITY

Entity name : Application

Aliases : DD Form 1746

Description : The form required to be submitted in order to be considered for housing assignment.

Elements :

Aliases :

Date submitted
Date/time application received
Effective date of application
Date housing availability form sent

Element name : Date submitted

Format : numeric

Size : 6 (MMDDYY)

Description : The date the application for housing assignment was sent to the activity by the member.

Element name : Date/time application received

Format : numeric

Size : 10 (MMDDYY,time)

Description : The date and time the application is processed for application to housing.

Element name : Effective date of application

Format : numeric

Size : 6 (MMDDYY)

Description : The actual departure from the member's last duty station.

Element name : Date housing availability form sent

Format : numeric

Size : 6 (MMDDYY)

Description : The date the housing availability form is sent in response to the member's application for housing.

C. WAITING LIST ENTITY

Entity name : Waiting list

Aliases :

Description : A list of members that are eligible for the same type of unit.

Elements : Aliases :

Grade classification
Number of bedrooms
Housing availability
Effective date and time

Element name : Grade classification

Format : alphabetic

Size : 6

Description : The type of units the list is compiled for by the date of rank seniority (junior, field, or senior officer).

Element name : Number of bedrooms

Format : numeric

Size : 1

Description : The number of bedrooms the list is compiled for.

Element name : Housing availability

Format : alphanumeric

Size : 8

Description : The statements indicated as valid on the housing availability form sent to the member.

Element name : Effective date and time

Format : numeric

Size : 10 (MMDDYY,time)

Description : The day the member arrives at the housing office.

D. INVENTORY ENTITY

Entity name : Inventory

Aliases : Furnishings, Property

Description : The classification and categorization of all property that housing
is held responsible for.

Elements :

Aliases :

Location

Quantity

Item name

Item model number

Item serial number

Item date installed

Item date last inventoried

Bench stock nomenclature

National stock number

Unit of Issue

Bench Stock, Consumables

NSN

Element name : Location

Format : alphanumeric

Size : 15

Description : The identifying location of the inventory item.

Element name : Quantity

Format : numeric

Size : 3

Description : The number of items at that location.

Element name : Item name

Format : alphabetic

Size : 10

Description : The name of the item.

Element name : Item model number

Format : alphanumeric

Size : 10

Description : The model number of the item.

Element name : Item serial number

Format : alphanumeric

Size : 12

Description : The serial number assigned to the item.

Element name : Item date installed

Format : numeric

Size : 6 (MMDDYY)

Description : The date the item was installed/received.

Element name : Date item last inventoried

Format : numeric

Size : 6 (MMDDYY)

Description : The date the item was last inventoried.

Element name : Bench stock nomenclature

Format : alphabetic

Size : 20

Description : The name of an inventory item that is considered a consumable item to be used in the repair of something. An example is furnace filters or drain cleaner.

Element name : National stock number

Format : alphanumeric

Size : 15

Description : The GSA assigned number that identifies the item.

Element name : Unit of Issue

Format : alphanumeric

Size : 8

Description : The unit of issue appropriate for the Inventory accounting, such as 1 each, case, box(es).

E. UNIT ENTITY

Entity name : Unit

Aliases :

Description : The classification and categorization of all units that housing is held responsible for.

Elements :

Aliases :

Street address
Building number
Building type
Number of bedrooms
Square feet
Number of bathrooms
Carport
Fireplace
Project
Lockset
Fences
Ham radio
Gas dryer

Element name : Street address

Format : alphanumeric

Size : 15

Description : The unique identifying mailing address of each unit.

Element name : Building Number

Format : numeric

Size : 4

Description : The number assigned to the entire structure of which the unit is a part.

Element name : Building type

Format : alphanumeric

Size : 6

Description : Indicates the type of floorplan.

Element name : Number of bedrooms

Format : numeric

Size : 1

Description : Indicates the number of bedrooms of that unit.

Element name : Square feet

Format : numeric

Size : 4

Description : Indicates the total square footage available at that unit.

Element name : Number of bathrooms

Format : numeric

Size : 2

Description : Indicates the number of bathrooms available at that unit.

Element name : Carport

Format : alphanumeric

Size : 5

Description : Indicates the presence, absence and location of a carport at that address.

Element name : Fireplace

Format : alphabetic

Size : 3

Description : Indicates the presence or absence of a fireplace at that address.

Element name : Project

Format : alphabetic

Size : 10

Description : An indicator of when the unit was built.

Element name : Lockset number

Format : alphanumeric

Size : 10

Description : Indicates the unit lock serial number (found on the key).

Element name : Fences

Format : alphabetic

Size : 3

Description : Indicates approval for member fence installation.

Element name : Ham radio

Format : alphabetic

Size : 3

Description : Indicates if a unit is presently being inhabited by a member who requires specific permission to structurally alter or to affix hobby equipment to the structure.

Element name : Gas Dryer

Format : alphabetic

Size : 3

Description : Indicates if a unit has an active gas line for a member's gas
dryer.

F. MAINTENANCE ENTITY

Entity name : Maintenance

Aliases : Unit history

Description : The classification and categorization of all maintenance work done on any unit or inventory item of that unit.

Elements :

Aliases :

Maintenance location

Maintenance type

Job order number

Start date

Completion date

Element name : Maintenance location

Format : alphanumeric

Size : 15

Description : The location of the maintenance action.

Element name : Maintenance type

Format : alphabetic

Size : 10

Description : A category of maintenance for aggregation purposes. An example would be "roof leak" or "routine".

Element name : Job order number

Format : alphanumeric

Size : 6

Description : The control number against which all charges are made.

Element name : Start date

Format : numeric

Size : 6 (MMDDYY)

Description : The date the maintenance was started.

Element name : Completion date

Format : numeric

Size : 6 (MMDDYY)

Description : The date the maintenance was completed.

G. REQUISITION ENTITY

Entity name : Requisition

Aliases :

Description : The mechanism to log expenses or requests for obligation of funds.

Elements :

Aliases :

Original document code

ODC

Description

Vendor

Call number

Basic job order number

Basic

Specific job order number

Specific

Labor hours

Labor

Job order number labor costs

Contract number

Request for contract number

RC number

Element name : Original document code

Format : numeric

Size : 8

Description : This is a unique identifying code assigned to all material or services requisition forms. Its purpose is to uniquely identify that particular document. Its format is as follows. The first digit is for fiscal year, the next three digits are for the receiving day's julian date, and the last four digits are sequential numbers assigned as the document is processed.

Element name : Description

Format : alphanumeric

Size : 30

Description : This is a narrative on what the requisition document is for.

Element name : Vendor

Format : alphabetic

Size : 15

Description : This is the name of the person or company supplying the service or material.

Element name : Call number

Format : numeric

Size : 4

Description : A code to track any purchases under a Blanket Purchase Authority.

Element name : Basic job order number

Format : alphanumeric

Size : 5

Description : This number indicates those budget line item costs less than 16 manhours or five hundred dollars, or both. It is used locally to accrue costs. Its format is as follows. The first letter is for type of funds, the second letter is for the cost originator, and the last three numbers indicate the budget project.

Element name : Specific job order number

Format : alphanumeric

Size : 5

Description : This number indicates those budget line item costs greater than 16 manhours or five hundred dollars, or both. It is used locally to accrue costs. It must necessarily have a controlled maintenance project associated with it. Its format is as follows. The first letter is for type of funds, the second letter is for the cost originator, and the last three numbers indicate the budget project.

Element name : labor hours

Format : numeric

Size : 5

Description : Those hours expended by the maintenance department, by job order number, under its budget line code.

Element name : Job order number labor costs

Format : numeric

Size : 7

Description : Those hours expended by the maintenance department, by job order number, in dollar amounts.

Element name : Contract number

Format : alphanumeric

Size : 9

Description : The identifying number assigned all contract maintenance or services that all costs are incurred against.

Element name : Request for contract number

Format : alphanumeric

Size : 10

Description : A number assigned to all contracts for the comptrollers use.

H. FUNDS ENTITY

Entity name : Funds

Aliases : Operations, Maintenance, or O & M Funds

Description : The classification and categorization of all funds for which Housing is held responsible. It is used to reimburse obligations incurred.

Elements :

Aliases :

Budget project	BP
Budget line code	BLC
Cost account code	CAC
Segment number	
Controlled maintenance project	CMP
Committed funds	Committed
Actual expense	Actual
Difference	
Balance	
Budget line code labor	BLC labor
Fiscal year budget line code request	FY BLC request
Fiscal year EFD BLC validation	
Annual planning figure	APF

Element name : Budget project

Format : numeric

Size : 2

Description : This is a division of the Operations and Maintenance subaccount that categorically delineates exact totals of funds that can be obligated for a specific purpose only. The entire budget is divided into five separate "pots" of money and funds transfer between these is not authorized without higher approval. An example is Budget Project 20, used only for maintenance and repair.

Element name : Budget line code

Format : alphanumeric

Size : 4

Description : This code indicates a particular kind of expense within one budget project. It's format is as follows. The first letter indicates Operations funds (A) or Maintenance funds (B), the two numbers indicate a category and the last letter, a sub-category.

8. 1.3.3 Coordinate Termination Data Usage Chart

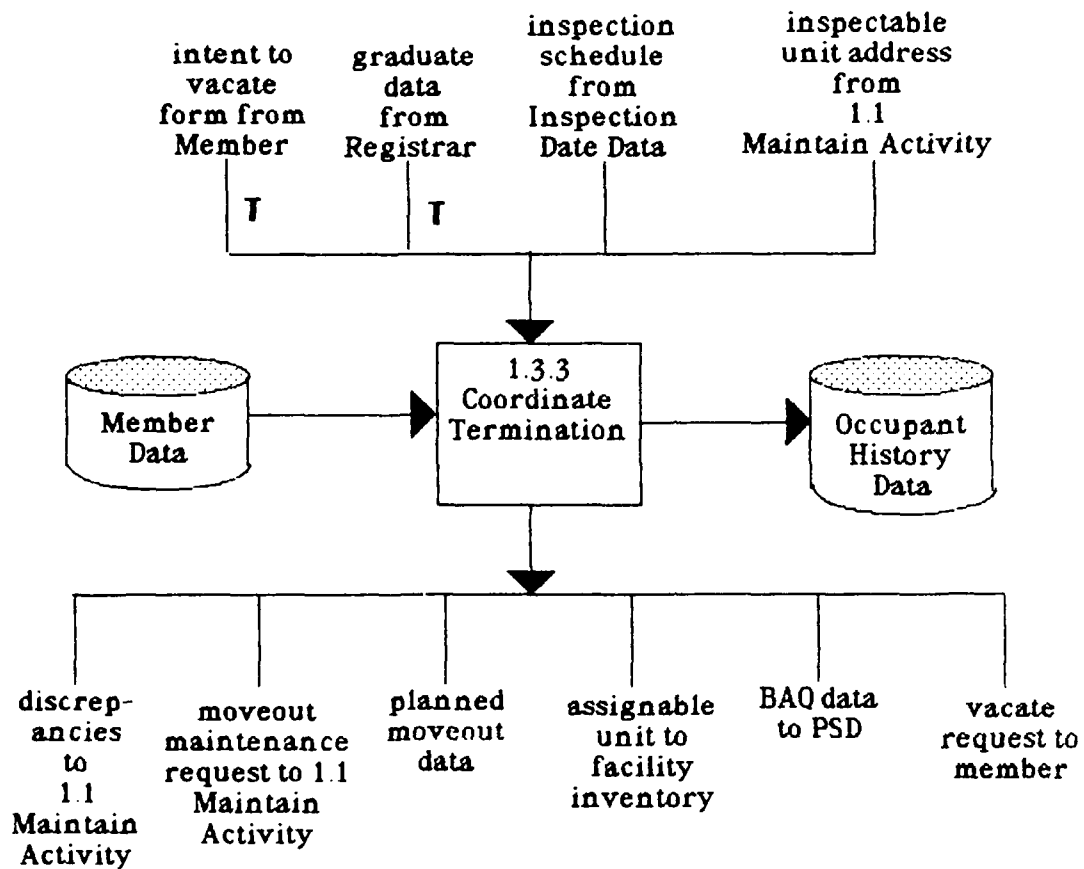


Figure 29
Coordinate Termination Data Usage Chart

7. 1.3.1 Coordinate Assignment Data Usage Chart

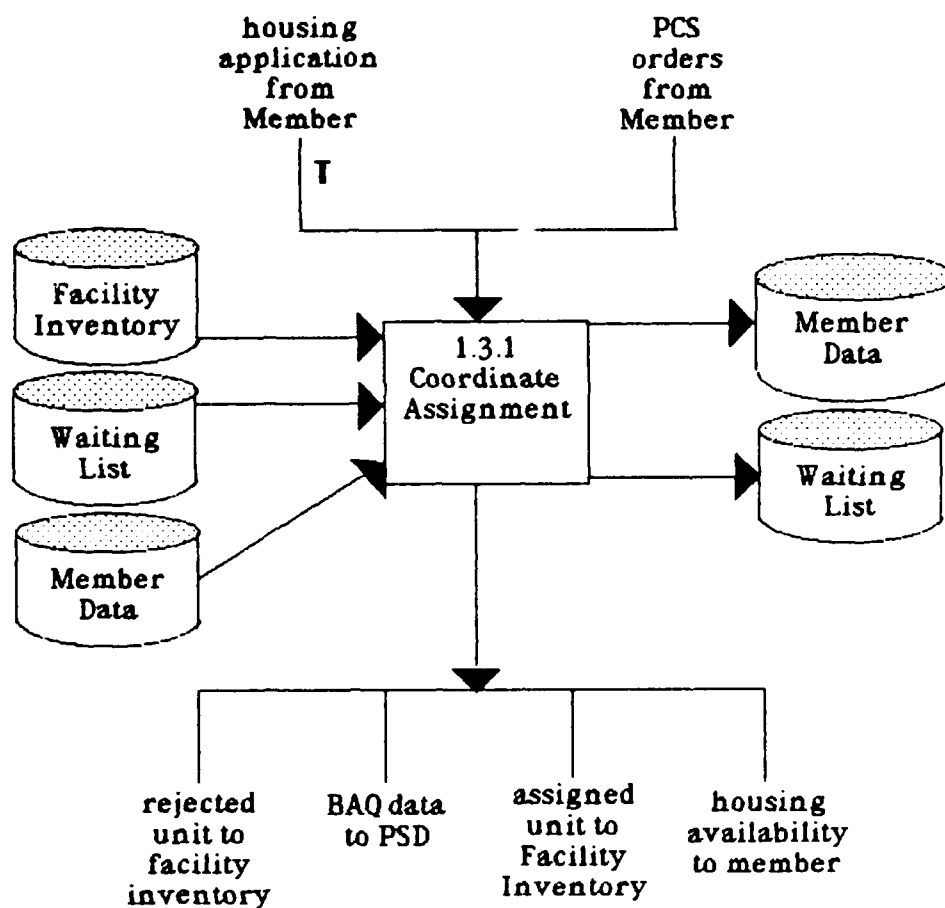


Figure 28
Coordinate Assignment Data Usage Chart

6. 1.2.4 Sustain Furnishings Inventory Data Usage Chart

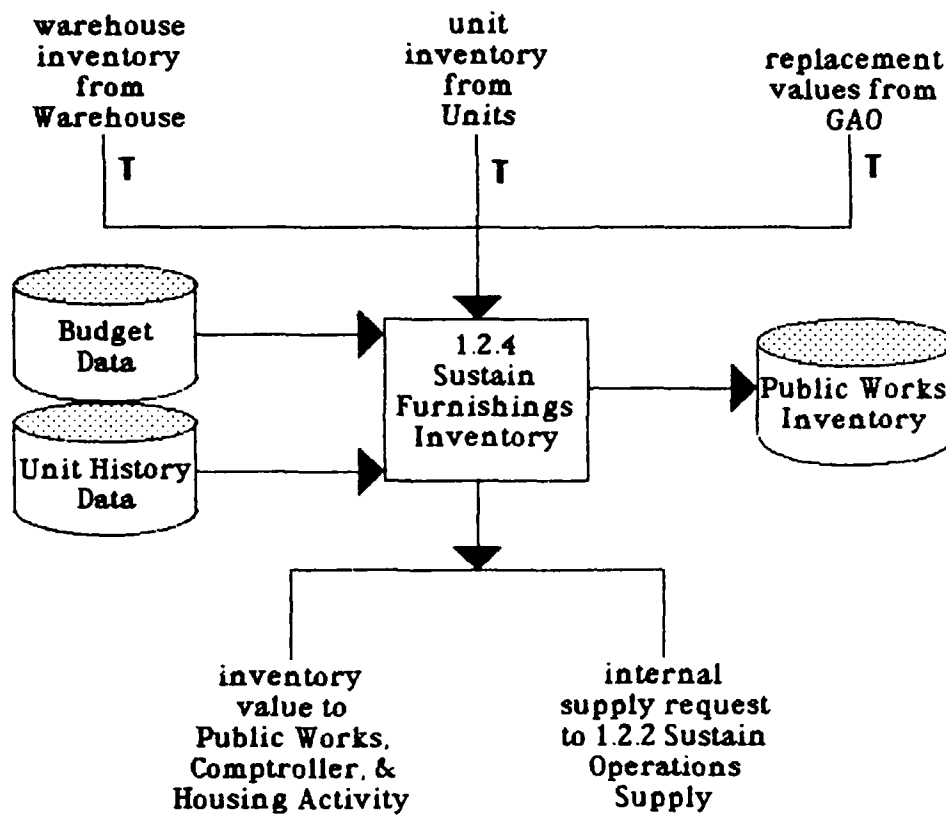


Figure 27
Sustain Furnishings Inventory Data Usage Chart

5. 1.2.3 Conserve Utilities Data Usage Chart

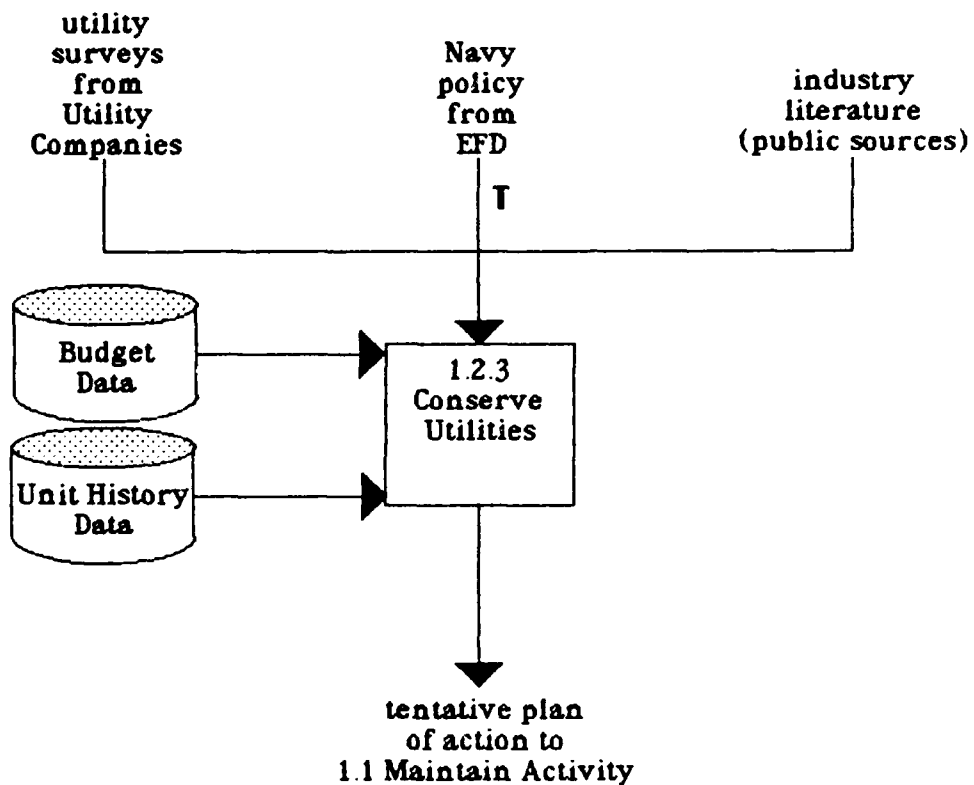


Figure 26
Conserve Utilities Data Usage Chart

4. 1.2.2 Sustain Operations Supplies Data Usage Chart

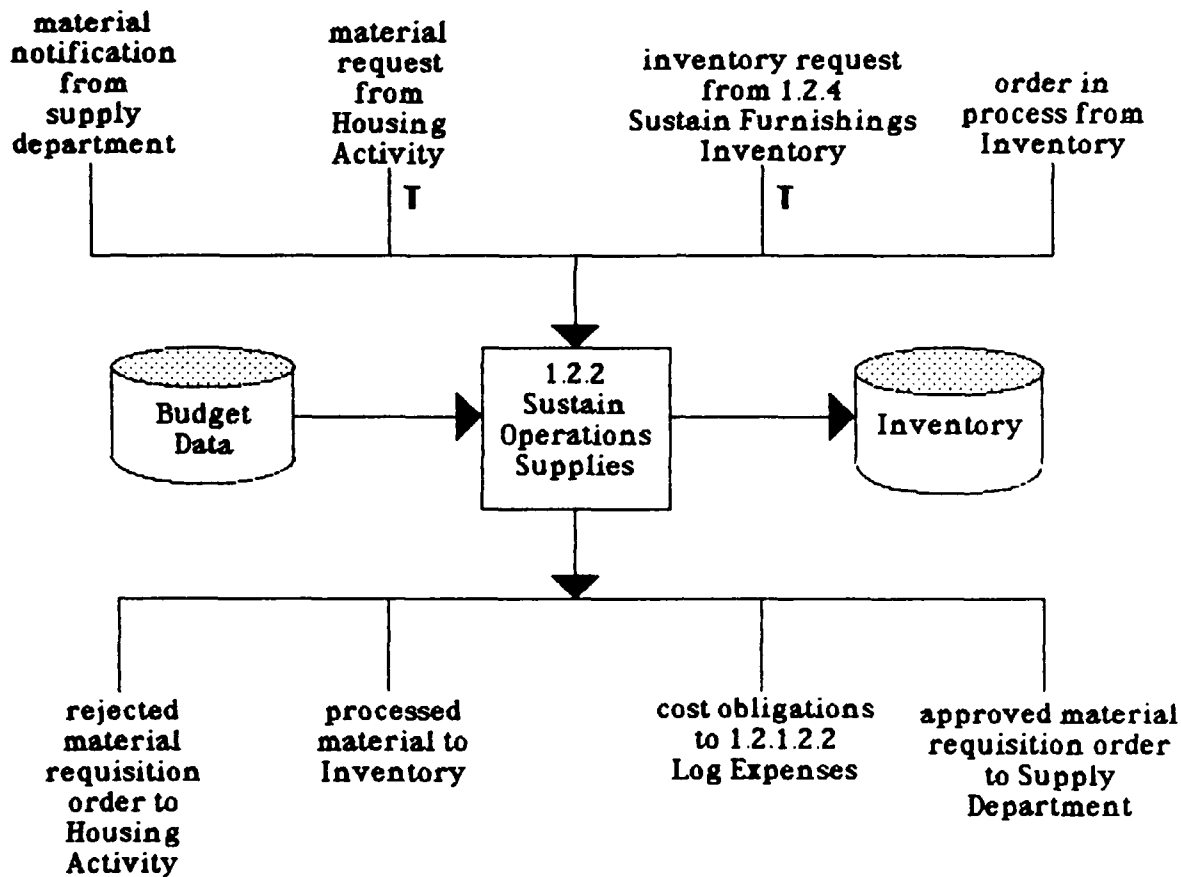


Figure 25
Sustain Operations Supplies Data Usage Chart

3. 1.2.1.2 Execute Budget Data Usage Chart

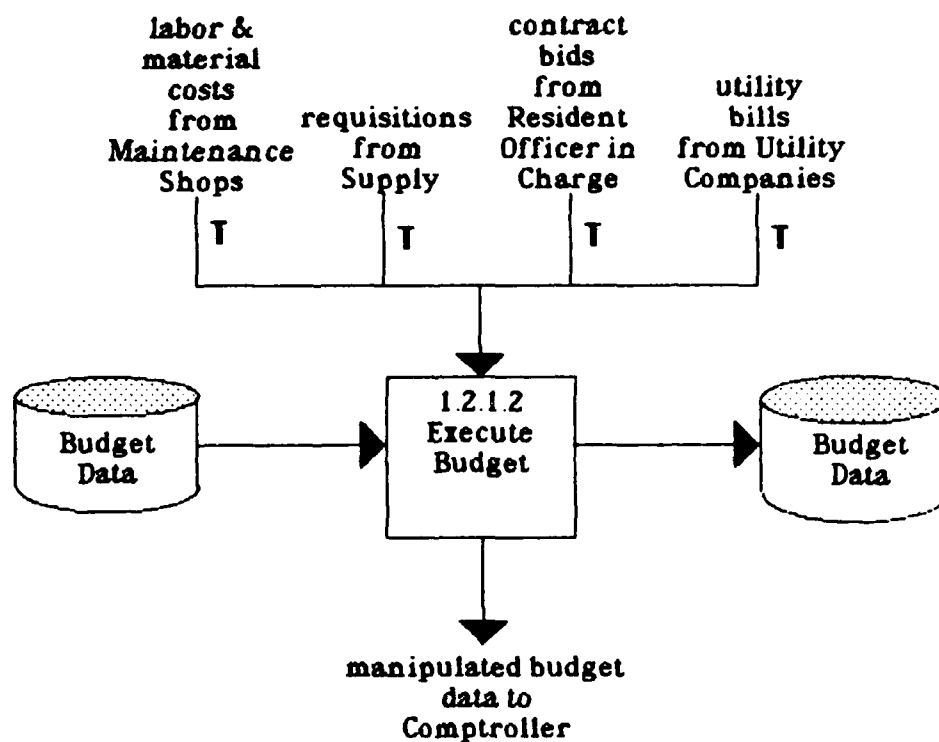


Figure 24
Execute Budget Data Usage Chart

2. 1.2.1.1 Prepare Budget Data Usage Chart

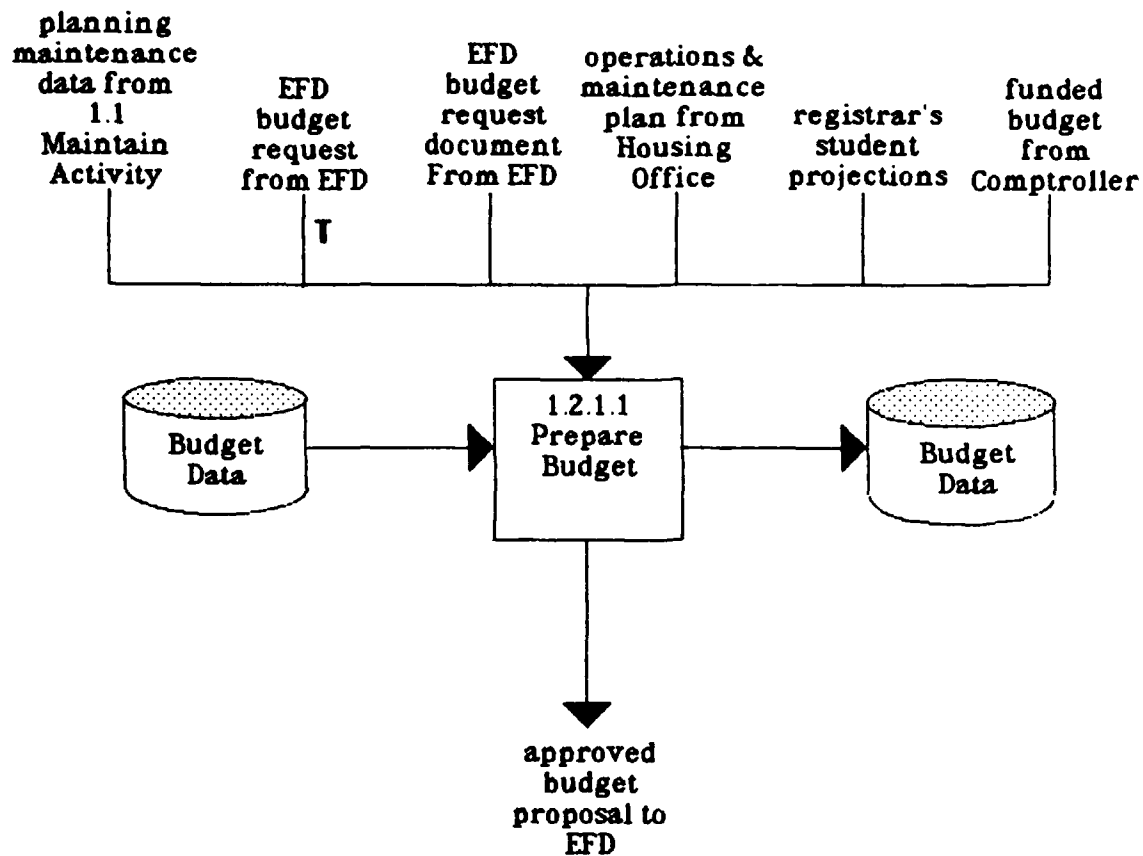


Figure 23
Prepare Budget Data Usage Chart

1. 1.1 Maintain Activity Data Usage Chart

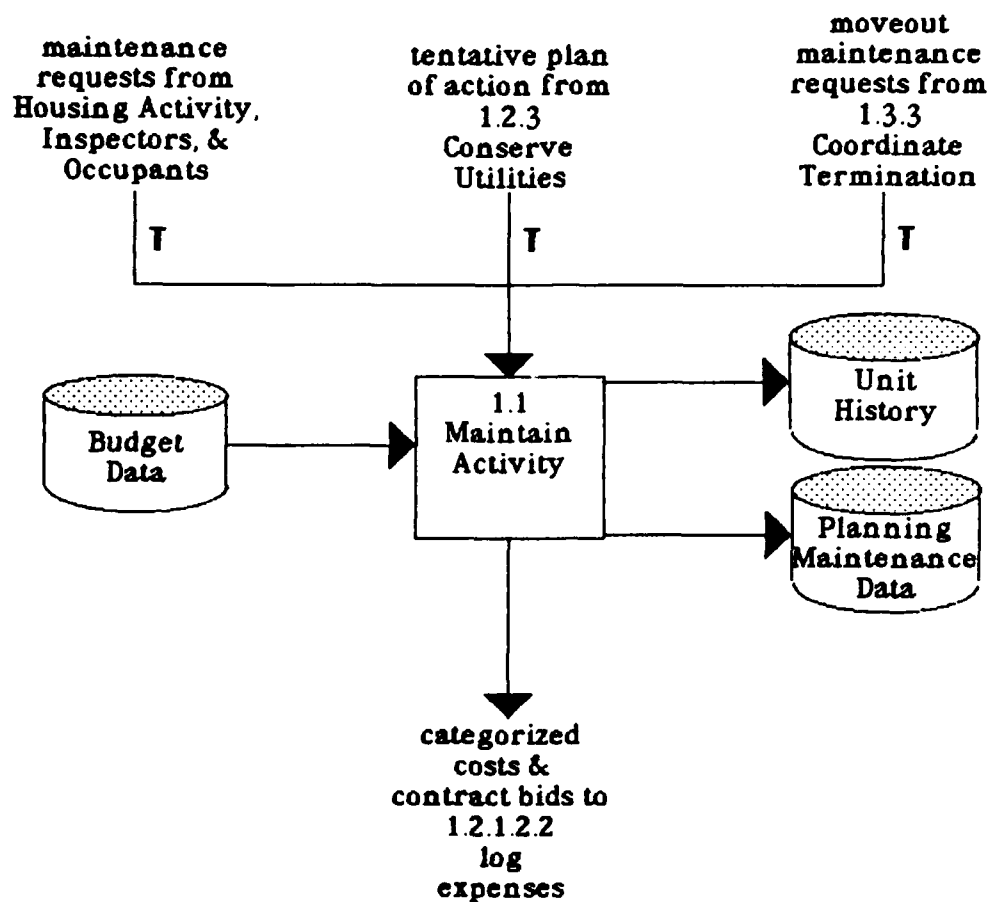


Figure 22
Maintain Activity Data Usage Chart

IV. DATA USAGE ANALYSIS

A. TRANSFORM ANALYSIS

Information that is to be processed by any system or functional part of that system must initially enter from the outside world. All such external information must be converted into some internal form for processing. At the level of detail followed throughout this thesis, it is not important how this information is internalized to that particular function, but what is needed for the function (or transformation) to take place. The level that is refined here is the applicable Data Flow Diagram seen as a "black box", with those information flows needed for its operation.

The following graphical analysis is a refinement of the applicable data flow diagram data inputs, the data stores utilized, and the function's resultant output. The data on the upper line structure is information which the function requires to accomplish its actions. A capital "T" indicates that information is a trigger of the function. A trigger is some data or requirement that causes the function to occur. The data store on the left of the function block represents that collection of data from which the function must draw to accomplish its actions. The data store on the right of the function represents that collection of data on which the function operates (update, delete, add, etc.). The data on the lower line structure represents the output the function produces.

From Module 1.2.2.2 of Sustain Operations Supply to Supply Department

Any request that cannot be fulfilled through the internal (base) ready supply department or is at a total cost greater than five hundred dollars must be routed through the supply department. The appropriate forms for requisition are completed and submitted to the Supply Department. The Supply Department can authorize use of a Blanket Purchase Agreement or order the items from DOD sources.

From Module 1.2.4.3 of Sustain Furnishings Inventory to Public Works

Because the housing activity is responsible for only a portion of the Property Account of the entire base, it's entire property inventory must be reported to Public Works. While the activity maintains the facilities assigned to it, Public Works Department has ultimate responsibility of all inventoried property items.

From the Comptroller Office to Module 1.2.1.1.5 of Prepare Budget

Upon receipt of the allotted funds from the EFD slated for the housing activity (via a Form 2276) the Comptroller will contact the housing activity budget desk to relay those total amounts, by Budget Project, by Budget line code that was validated by the EFD and those amounts actually funded.

From Supply Department to Module 1.2.2.3 of Sustain Operations Supplies

After appropriate actions that fulfill the requirements of the supply requisition, the order in process is returned to the budget desk of the housing activity so that that actual costs and other information may be properly recorded for the housing activity records.

From Module 1.1.4 of Maintain Activity to Resident Officer in Charge

This interface involves those areas of maintaining an activity that require work to be contracted because the work is beyond the skill or scope constraints of the base Public Works Department. The housing activity identifies the area and initiates the request. After preliminary studies are conducted, the formal request is sent to the Resident Officer in Charge. Acting as a representative of the Engineering Field Division, this office continues the process of requesting funding for the contract. Bidding for the design and implementation of the requested construction then follows.

From Module 1.2.1.1.4 of Prepare Budget to Engineer Field Division

After all changes to the budget have been finalized, the approved budget request is forwarded to the Engineer Field Division for review and is incorporated into their request for funds. The EFD budget is then submitted to NAVFAC and congressional approval of a Family Housing Maintenance Account, Navy appropriation will be made. These funds are then allotted to the EFD and subsequently to the base activity Comptroller of each of the housing activities under its control.

From Module 1.2.1.2.3 of Execute Budget to Comptroller Office

Periodic reports on funds status are sent to the base comptroller office in order that that office's records can accurately reflect the funds flow of the housing activity. The comptroller office reports this data to the Area Accounting Activity that has ultimate accounting responsibility of all funds. This interface is important as a check on balance of payments made by the activity against its authorized funds.

III. EXTERNAL INTERFACES

Viewing the Housing Office as a subsystem of the entire Navy, it is obvious that there are many interactions between it and the other subsystems. Taken together, these subsystems comprise the entire Navy. Each subsystem has a sphere of authority and is responsible for its actions within this sphere. When it is required to interact with another subsystem, an interface occurs between these two separate subsystems. There will be a flow of information to or from the external subsystem between this interface. The external subsystems, or entities, must be fully identified so that proper information flow can be modelled. The Housing Office, then, is the system of interest for this model and the interfaces that cause information to flow to or from it are discussed below. Each is graphically depicted on the appropriate data flow diagram as a square (the external entity) with a zig-zagged line between it and a circle (a process in that function). In the title of each external interface, the module given relates to the process as described in the appropriate Navy Housing Functions (Chapter I) subheading. A brief explanation of the logical basis of each external interface follows. Internal interfaces will not be discussed.

From the Resident Officer in Charge to Module 1.1.5 of Maintain Activity

After completion of all aspects of bidding and contract negotiation, the awarded contract is then executed. The housing activity then monitors progress of the contractors to ensure timely and proper completion of the work agreed upon.

Element name : Balance

Format : numeric

Size : 9

Description : The amount of allotted funds remaining, by budget project.

Element name : Budget line code labor

Format : numeric

Size : 7

Description : The cost of labor, by job order number categorized by budget line code.

Element name : Fiscal year budget line code request

Format : numeric

Size : 7

Description : The dollar amount requested, by budget line code, for that particular year.

Element name : Fiscal year EFD budget line code validation

Format : numeric

Size : 7

Description : The dollar amount allowed by the EFD, by budget line code, for that particular year.

Element name : Annual planning figure

Format : numeric

Size : 7

Description : The dollar amount allotted by the EFD, by budget line code, for that particular year.

Element name : Cost account code

Format : alphanumeric

Size : 4

Description : This code indicates a particular type of expense subordinate to a budget line code. Its format is a mix of letters and numbers.

Element name : Segment number

Format : alphanumeric

Size : 4

Description : This identifies the budget project, the activity and the fiscal year of a budget line code transaction. It is utilized by the comptroller. Its format is as follows. the first letter is for identifying the different base activities, the second letter indicates the budget, and the last two numbers indicate the fiscal year.

Element name : Controlled maintenance project

Format : alphanumeric

Size : 5

Description : This is a code assigned to those budget line codes that have jobs exceeding sixteen manhours or five hundred dollars. It is used by the Area Accounting Activity for tracking those higher cost budget line codes. Its format is as follows. The first letter indicates the type of funds, the second letter indicates where the costs originate, and the last three numbers are sequentially assigned for identification purposes.

Element name : Committed funds

Format : numeric

Size : 9

Description : The estimated cost of the material or services requisition.

Element name : Actual expense

Format : numeric

Size : 9

Description : The actual cost of the material or service.

Element name : Difference

Format : numeric

Size : 7

Description : The variance between the Actual and the Committed costs of the material or service requisition.

B. TRANSACTION ANALYSIS

It is important to insure that all areas normally developed in a logical design are incorporated within this study. Transaction analysis is considered by some as a portion of a logical design. It is discussed here purely in theoretical terms for a more complete understanding of the logical design process. No specific reference is made to the La Mesa Housing Activity logical design.

Transaction analysis is another modular design technique that builds on the concept of a transaction, that is, any occurrence of data that triggers an action or sequence of actions. This type of design strategy is suggested by data flow diagrams that "fan out" at one process. An example is the data flow diagram for 1.1, Maintain Activity, process 1.1.1. It is important to contrast transaction analysis to that of transform analysis for complete understanding of the system design process. While both strategies make the transition from the logical to the physical design more straightforward, transform or transaction analysis may or may not be appropriate to a particular design stage. There is always a question as to which level of detail the design should extend. The gray area of this issue starts at this point in logical design.

The transform analysis technique builds on the concept of data transformation. This high level design looks at functions that call on highly processed input data and lower level modules subordinate to this function. It then transforms the data to the appropriate logical output. To make this distinction clearer, below are definitions of transaction and transformation.

Transaction - a signal, event or unit of data that triggers or initiates some action or sequence of actions [Ref.1].

Transformation - to change information in structure or composition without altering the meaning or value, or normalize, edit, or substitute [Ref.2].

These definitions imply a fundamental difference in the action taken. Transactions are triggers that are singular units, measurable, and cause processes to occur. A transform, however, is more concerned with the overall processing that occurs, not the detailed measurements or elemental composition of the input or output. Below are definitions of transaction analysis and transform analysis.

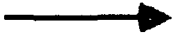
Transaction Analysis - a modular design strategy based on an analysis of the sources, types and actions of transactions in a system [Ref.3].

Transform Analysis - a modular design strategy in which program or system structure is derived from an identification of the input, output, and transformations required to transform inputs into outputs; analysis of data flow and transformation [Ref.4].

It should be clear that the major difference is the level of detail. It is this author's opinion that transform analysis is required for logical mapping of a function as part of a system logical design. Transaction analysis, then, becomes the first step of the detailed design phase of a system life cycle. While there is a definite distinction between these two types of analysis, it is important to realize they are parallel techniques which derive different information from the same sources.

V. DATA RELATIONSHIPS

The following series of eight charts are representative of each function's use or need of a data entity in order to perform the prescribed actions. This straightforward analysis clearly shows relationships between entities within the context of the function. The following symbology is used.

-  Signifies the entity is not needed by that function.
-  An entity with the appropriate name within.
-  Signifies no relation exists in that function.
-  Signifies a one to one relation exists.
-  Signifies a one to many relation exists.
-  Signifies a many to one relation exists.
-  Signifies a many to many relation exists.

No line between entities signifies no relation exists at any time between two entities, regardless of the function being performed. Each solid line is numbered; each instance of that relation is noted on the chart.

A. 1.1 MAINTAIN ACTIVITY DATA RELATIONSHIP CHART

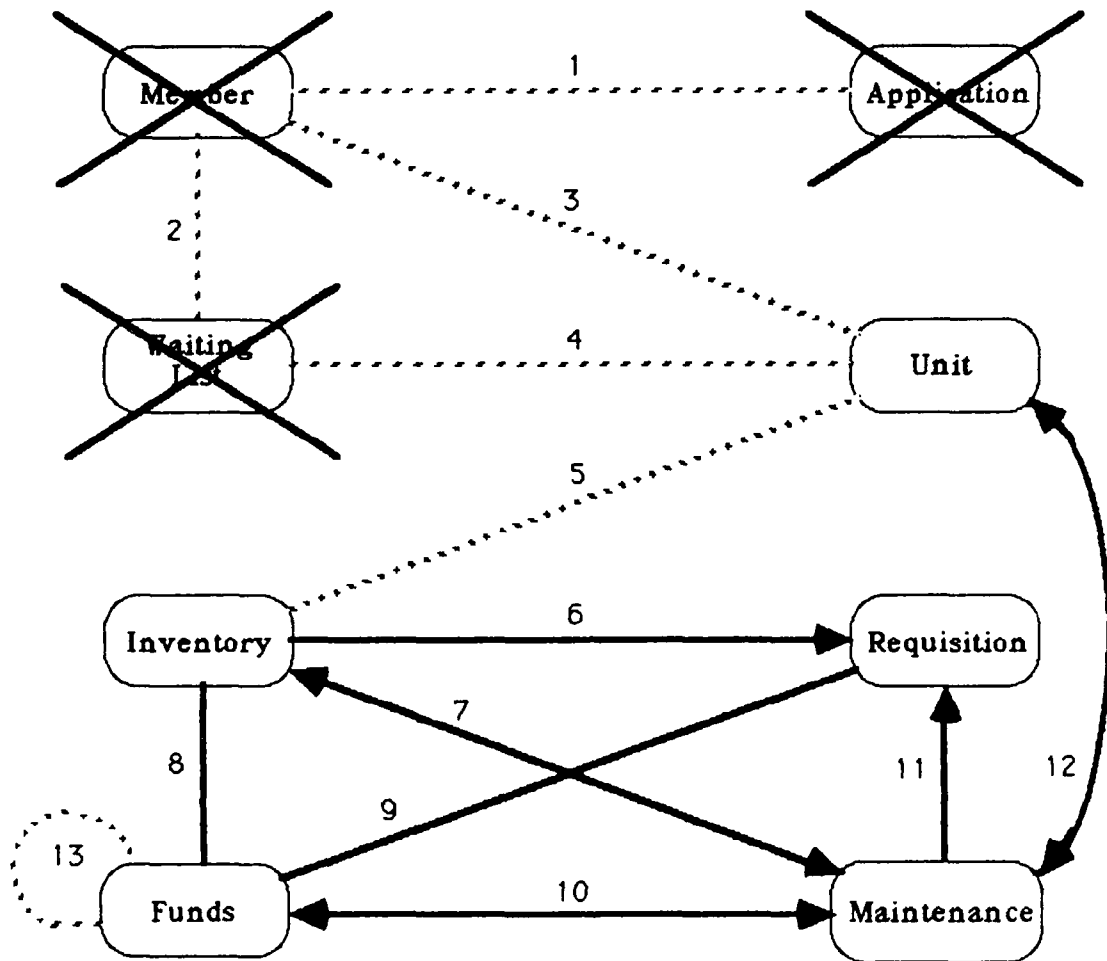


Figure 30
Maintain Activity Data Relationship Chart

The following relates to the preceeding figure, Figure 30, Maintain Activity.

6) Requisitions are generated for Inventory item restocking.

7) Inventory items require maintenance to keep them in working order.

Inventory items are used in order to complete maintenance action needs.

8) Inventory item utilization is recorded with the Funds data.

9) Requisitions are charged against specific Funds.

10) Funds pay for all Maintenance.

Maintenance is categorized by the funds it uses.

Initial estimates of maintenance are made based on historical Funds data.

Maintenance department estimates are approved or rejected based on Funds available.

11) If material is needed that is not available in Inventory, Requisition is used for procurement.

12) Units have many types of maintenance required to keep them habitable.

Maintenance categories are performed on units.

B. 1.2.1.1 PREPARE BUDGET DATA RELATIONSHIP CHART

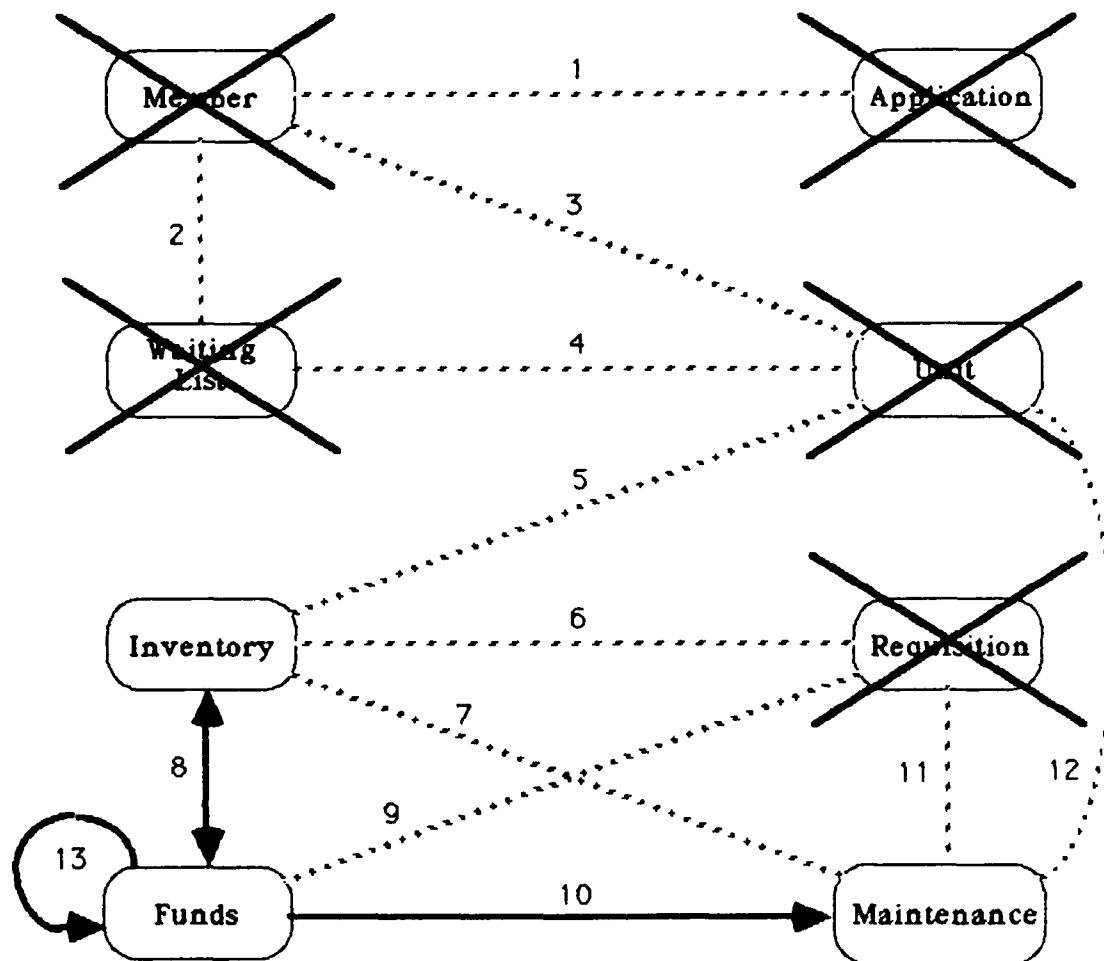


Figure 31
Prepare Budget Data Relationship Chart

The following relate to the preceding figure, Figure 31, Prepare Budget.

- 8) Replacement value of Inventory items are needed for budget preparation.

Projected Inventory shortfalls to meet future needs are needed.

- 10) Planned maintenance is utilized to project future needs to maintain the activity at acceptable standards.

Maintenance uses Funds to prioritize future requirements.

Maintenance uses Funds to validate what is expected versus how much is budgeted for the service.

- 13) Funds are hierarchical. A total budget is made up of budget projects, which are made up of budget line codes, which are further made up of cost account codes. These portions are associative in order to prepare a budget.

C. 1.2.1.2 EXECUTE BUDGET DATA RELATIONSHIP CHART

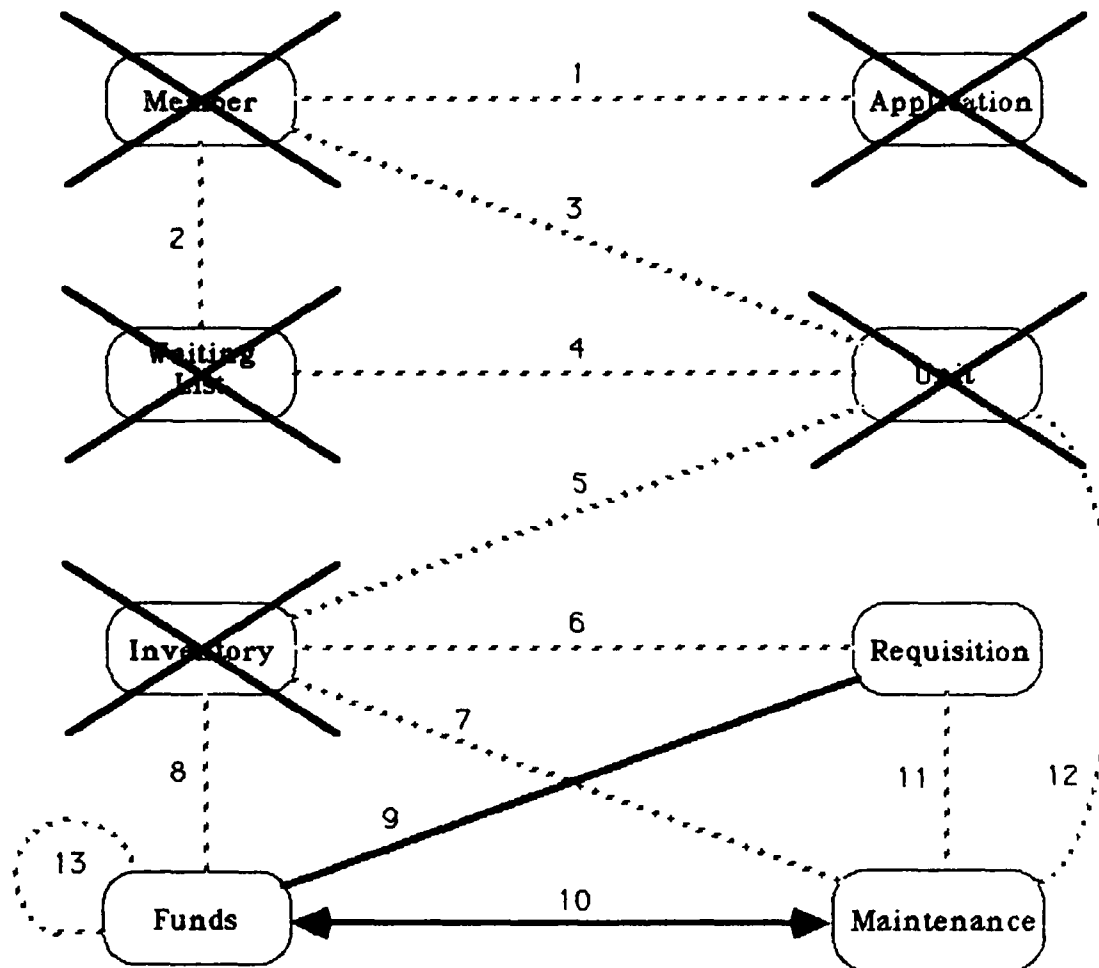


Figure 32
Execute Budget Data Relationship Chart

9) Requisitions are paid for by Funds.

10) Maintenance is paid for by Funds.

D. 1.2.2 SUSTAIN OPERATIONS SUPPLIES DATA RELATIONSHIP CHART

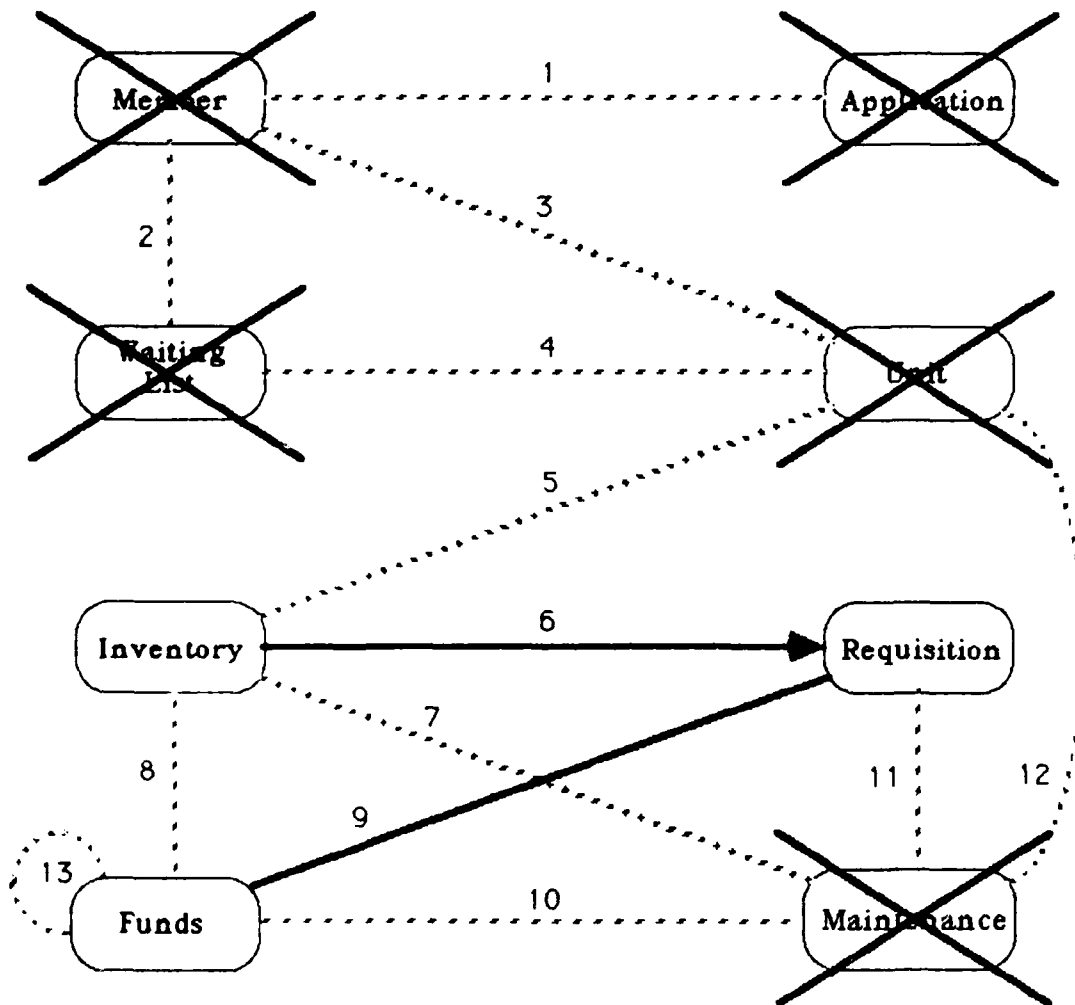


Figure 33
Sustain Operations Supplies Data Relationship Chart

- 6) Requisitions order inventory items.
- 9) Requisitions are paid for by Funds.

E. 1.2.3 CONSERVE UTILITIES DATA RELATIONSHIP CHART

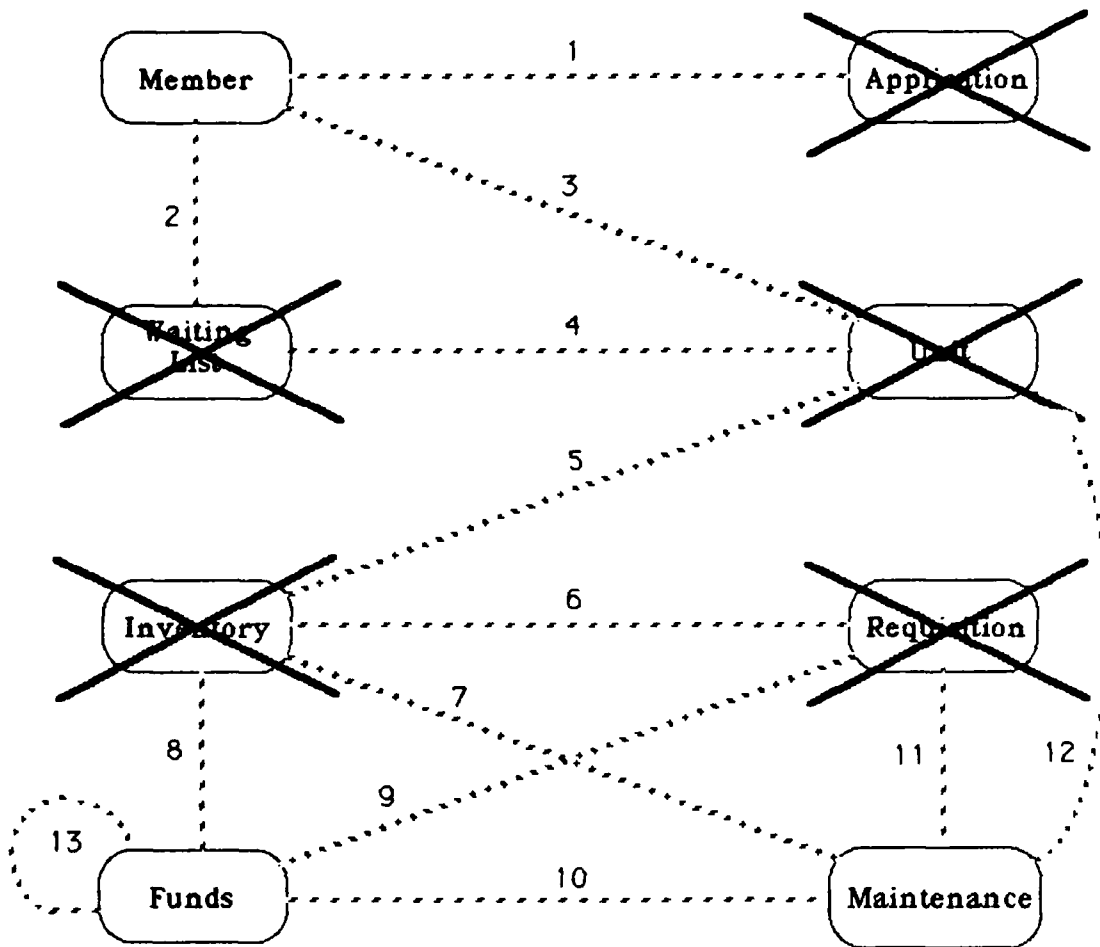


Figure 34
Conserve Utilities Data Relationship Chart

There are no relationships between entities in this function.

F. 1.2.4 SUSTAIN FURNISHINGS INVENTORY DATA RELATIONSHIP CHART

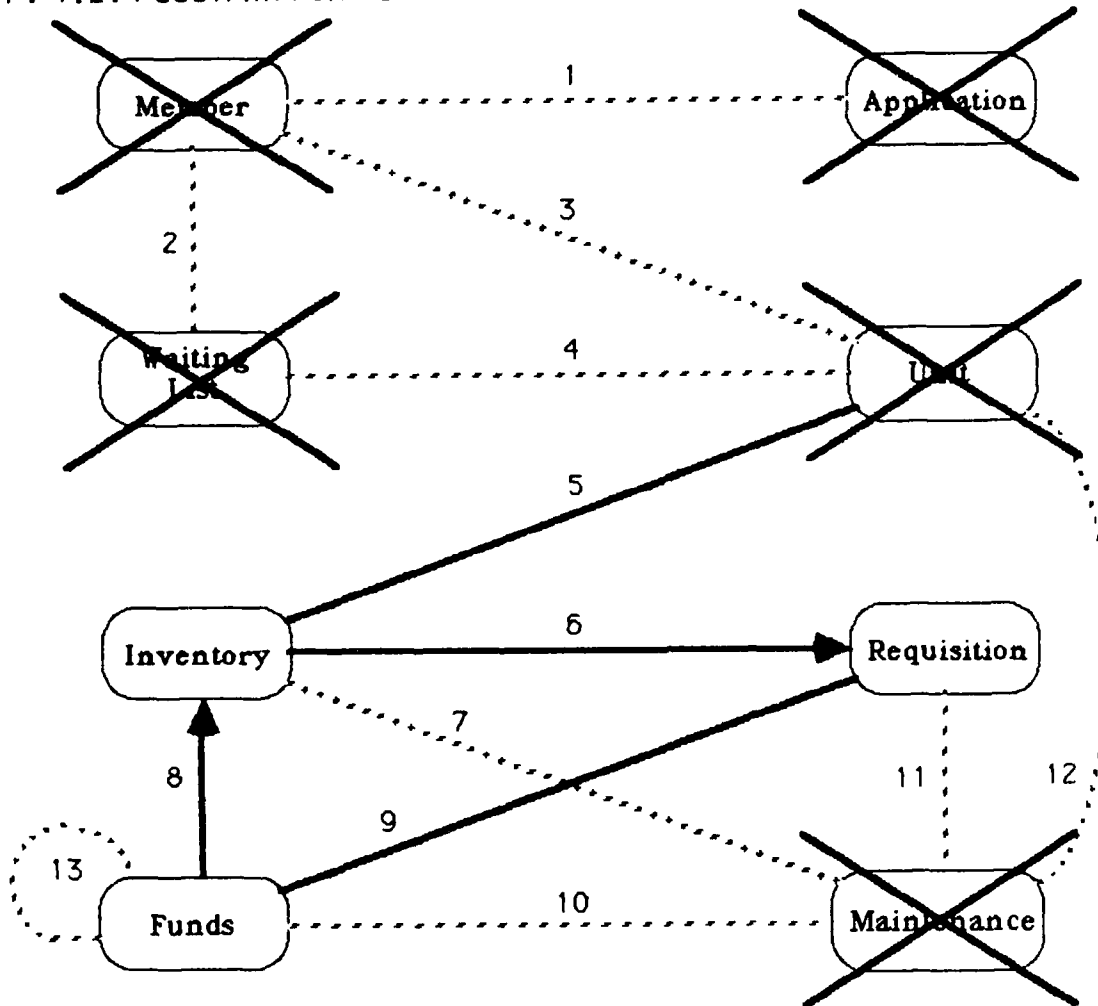


Figure 35
Sustain Furnishings Inventory Data Relationship Chart

- 5) For any Unit there is a set of Inventory items assigned to it.
- 6) Inventory requires Requisition to purchase stock to maintain adequate numbers of items.
- 8) Inventory items are categorized by Funds.
- 9) Requisitions are paid for by Funds.

G. 1.3.1 COORDINATE ASSIGNMENT DATA RELATIONSHIP CHART

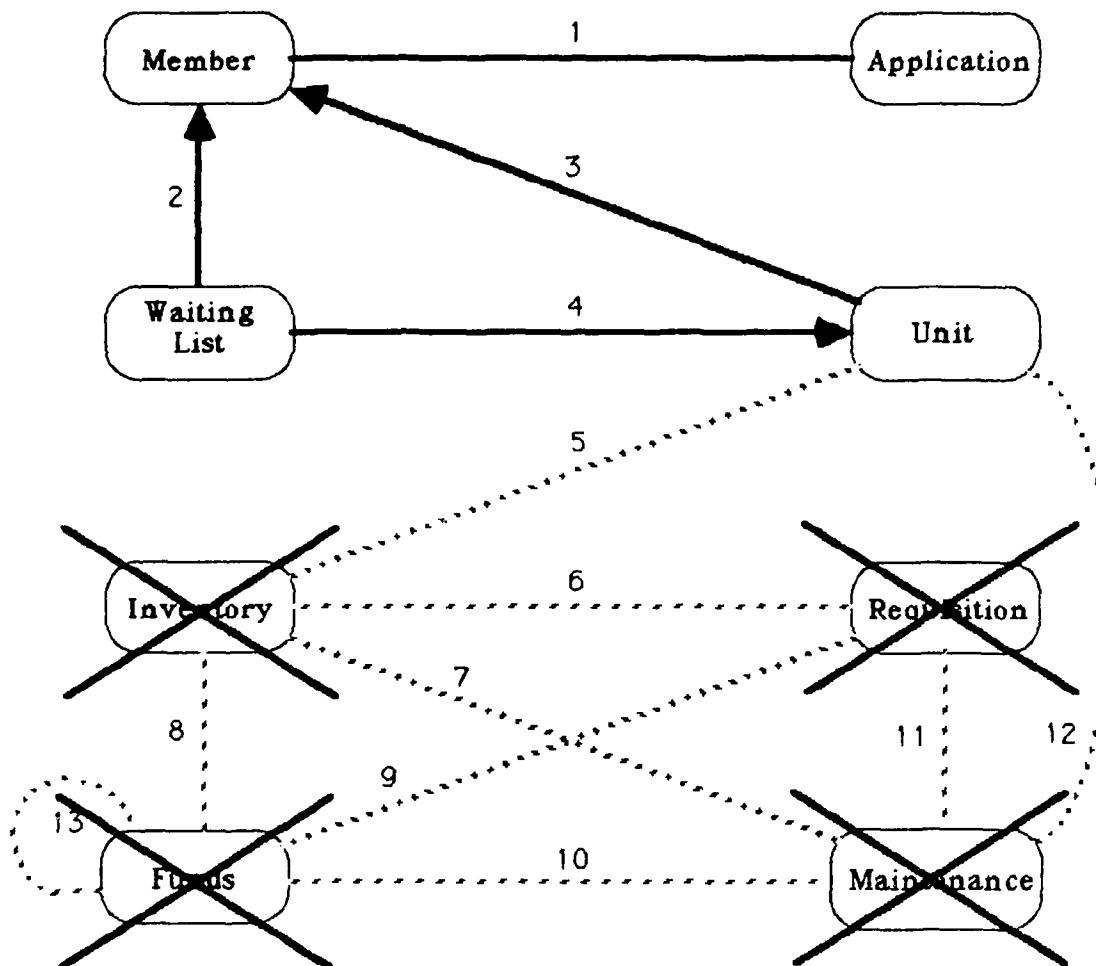


Figure 36
Coordinate Assignment Data Relationship Chart

- 1) A Member must fill out and submit an Application.
- 2) A Member is assigned to a waiting list.
- 3) A Member is assigned to a Unit.

A Unit has past Members associated to it for historical purposes.

- 4) A waiting list is applicable to a set of units, categorized by the waiting list criteria.

H. 1.3.3 COORDINATE TERMINATION DATA RELATIONSHIP CHART

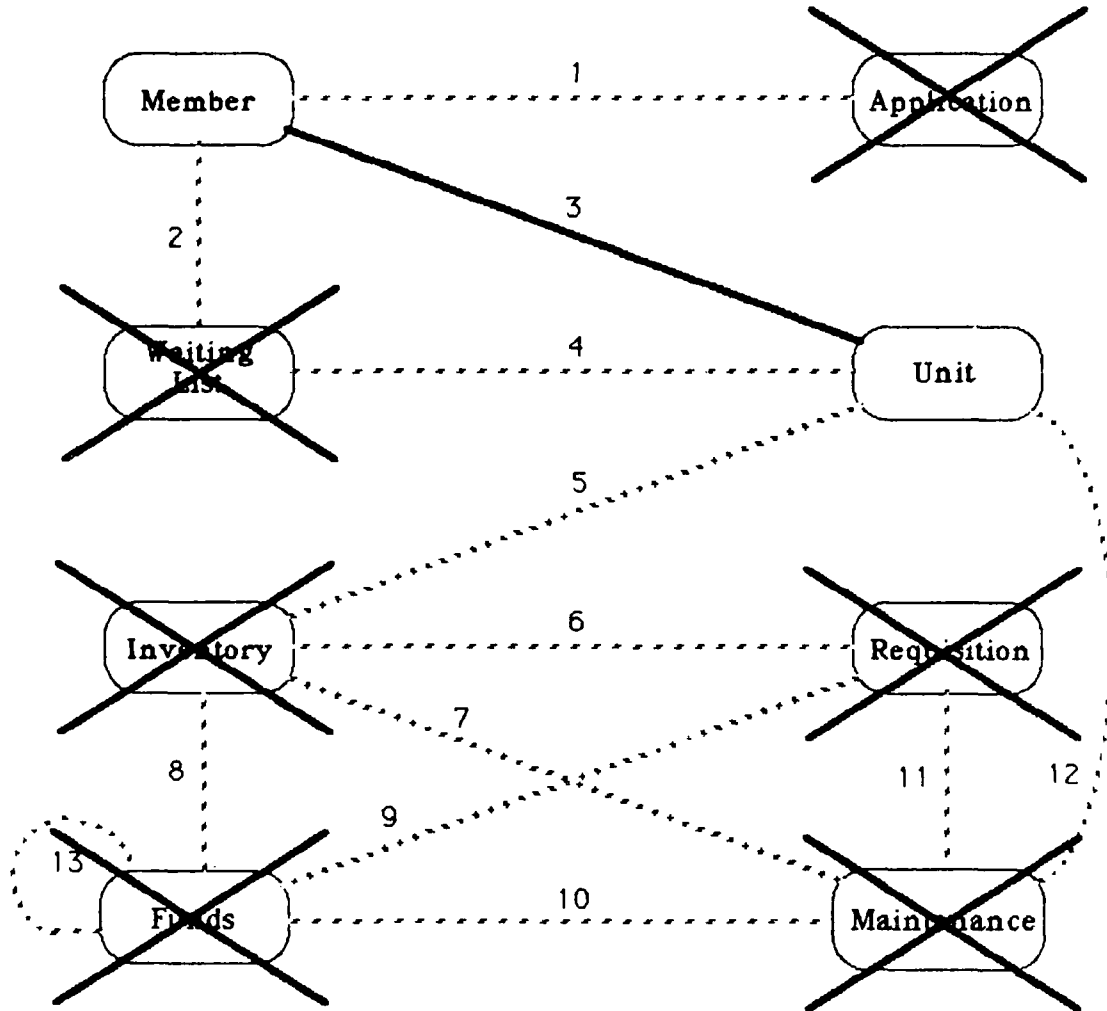


Figure 37
Coordinate Termination Data Relationship Chart

3) A Member is responsible for the physical unit prior to termination.

A Member and Unit are separated at termination.

VI. CONCLUSIONS

The La Mesa Housing Project received a Wang Office Information System model 60 (OIS-60) in July of 1984. This system is a sophisticated word processor with advanced text editing features. Additionally, the optional list of processing software was purchased and allows for list (record) processing of user defined files. This information processor is now being extensively used in the daily working of the office, and has assimilated virtually all of the office word processing needs. Many inventory and list applications such as the waiting list and the maintenance history files are also now being implemented on the OIS-60. However, no capability exists within this system for automatic update capabilities to the other files or records that are, or will be, affected by changing information. Manual collation of information is required; redundant information therefore follows. While being used to its fullest capabilities, inherent design constraints restrict the OIS-60 from being the true automation answer to the activity's needs.

Many of the information needs of the various processes cross the fundamental functional boundaries of Maintain Activity, Operate Activity, and Handle Occupant Relations. The critical area of information is Maintain Budget (1.2.1) of the Operate Activity function. Virtually all operations and maintenance activities revolve around the data processing of this closely watched and dynamic area. Internal interfaces exist between Budget Execution (1.2.1.2) and Maintain Activity (1.1) as well as Sustain Operations Supplies

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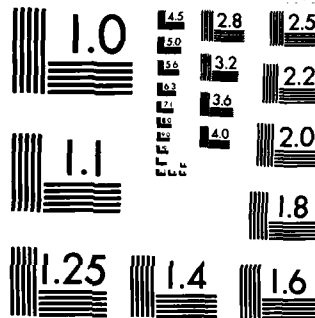
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(1.2.2). Budget data is required by all functions except those under Handle Occupant Relations (1.3). The Funds entity that is integral to Maintain Budget (1.2.1), is in some relationship in all functions except those in Handle Occupant Needs (1.3). Further, the Funds entity is a recursive entity in the budget execution function. It is also the most volatile entity, yet is not automated in any way. It is the one function around which all others (except coordinate assignment and termination) pivot. Past performance reports, day to day operations, and predictions on future needs require information on monetary status. In fact, maintenance history is categorized by budget line code. Redundant records are kept at this time to fulfill both budget requirements and historical information on the activity. While present automation capabilities are appropriate and being utilized fully, they overlook the one area that is most central to activity operation. Budget data are maintained by standard double entry bookkeeping procedures and are amenable to automation using off-the-shelf application software specifically designed for this purpose. While the Wang OIS-60 can run CP/M application programs that could satisfy this application, it cannot be extended to a database application that could eliminate redundancy of information.

The implementation of a stand alone system that integrates budget execution procedures with the many reports and historical files of past actions would greatly enhance accuracy and timeliness of information that must be utilized in all aspects of the execution of the Housing Activity duties. The La Mesa Housing Office has a viable manual system that is highly organized and workable, but it is a function of the people administering the system, not

the system itself. It is important, however, that this separate system with dedicated hardware and software be able to network with the OIS-60 in order to use its many features (word processing, list processing).

The information system requirements cut across all three functional areas of data processing use. Transaction processing is needed to maintain timely and correct budget information in a dynamic environment. This information, in turn, drives the short and long term decisions for maintenance management. Information on funds, occupancy, and maintenance drive future decisions of these same functions. But a need exists to maintain the budget and integrate the myriad expenses into the appropriate categories of information for these three areas of an information system. The WANG OIS-60 now in place is not central to the real needs, but adjunct to them.

The recommendation of this study is to model the Maintain Budget (1.2) function at a detailed design level, documenting the report needs of the information that is used. This is the central area of the activity, and should be examined further in an effort to design a system which provides the necessary requirements.

LIST OF REFERENCES

1. Weinberg, V., Structured Analysis, p. 320, Prentice-Hall, 1978.
2. Meek, C. L., Meek's Glossary of Computing Technology, CCM Information Corporation, p.240, 1972.
3. Weinberg, V., Structured Analysis, Prentice-Hall, p. 320, 1978.
4. Ibid, p. 320.

BIBLIOGRAPHY

Huffman, L., Primer, J., and Resuta, T., Systems Study Report : La Mesa Housing Project, paper submitted as final project for IS 3183, Management Information Systems, Naval Postgraduate School, 1984.

Navy Family Housing Manual, NAVFAC P-930, Department of the Navy Naval Facilities Engineering Command, September 1980.

Powers, M. J., Adams D. R., and Mills, H. D., Computer Information Systems Development : Analysis and Design, South-Western, 1984.

Pressman, R. S., Software Engineering : A Practitioner's Approach, McGraw-Hill, 1982.

Weinberg, V., Structured Analysis, Prentice-Hall, 1978.

Yourdon, E., Managing the Structured Technique, Prentice-Hall, 1978.

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