

**TROPICAL URBAN FORESTRY MASTER PLAN
PHASE II REPORT:
Street Tree Management Plan
For The City and County of Honolulu**



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VOLUME I: ANALYSIS OF EXISTING CONDITIONS



Executive Summary

Volume I of the TUFMP Phase II Report is devoted to an “Analysis of Existing Conditions”. This “Analysis” is divided into four parts, each of which is covered in a separate Chapter of the Report. These four areas are as follows:

1. Existing Urban Setting (Chapter 1.00)
2. Existing Physiographic Condition (Chapter 2.00)
3. Existing Street Tree Population Profile (Chapter 3.00)
4. Existing Policies, Regulations, Guidelines and Administration (Chapter 4.00)

The following is a summary of the findings from this analysis.

Existing Urban Setting

Chapter 1.00 of Volume I is devoted to a discussion of the two primary types of urban settings. The first is what has been identified as the “Legacy Condition” (See Section 1.01). This consists of all of the already built-out areas of urban Honolulu that were developed using subdivision development standards that existed prior to the year 2000. The second is what has been identified as the “New Subdivision Development Condition” (See Section 1.02). This consists of all new subdivision development that is just beginning to come online using the “New Subdivision Street Standards” adopted in the year 2000. There are only a very few of these areas in Honolulu. However, these standards are significant to the management of the urban forest because they create much more dedicated space to street tree planting areas than the earlier standards. The areas developed under the earlier standards consist of many curb miles of parkway planter strips that are very narrow (3 ft. or less in width) with very few trees per block (long stretches of many blocks have no street trees) and a very large number of vacant planting sites (street tree sites that are available to plant trees).

The most significant findings of this Chapter are as follows:

1. There is a very high percentage of vacant planting sites relative to planted street tree sites – of the approximately 82,000 documented street tree sites in urban Honolulu, 37% are vacant planting sites
2. A very high percentage of these vacant planting sites are in parkway planter strips that are three (3) ft. or less in width (88%)
3. The “New Subdivision Street Standards” require a minimum of six (6) ft. wide planter strips along even the narrowest collector street – even alleyways are required to have four (4) ft. wide planter strips
4. Very few “Large Size Species” can be planted in the documented vacant planting sites in urban Honolulu – conversely a very large percentage of vacant planting sites can only be planted with “Small Size” or “Medium Size” species
5. A very aggressive street tree planting program will be required to significantly increase canopy cover in the street tree sector of the urban forest – large quantities of smaller canopy trees will need to be planted rather than fewer large canopy species

Existing Physiographic Condition

Chapter 2.00 of Volume I is dedicated to a discussion of the “Existing Physiographic Condition” of urban Honolulu. Physiographic conditions refer to climatic, topographic, soil and vegetative conditions that exist independent of the urban setting, but that can interact with the urban setting conditions. Some of these physiographic conditions directly affect the growth of street trees, and should affect the selection, and maintenance prescriptions for street trees.

The most significant findings of this Chapter are as follows:

1. Air temperature and humidity are not limiting physiographic factors for vegetative growth
2. Most of the built up area of Honolulu is located in areas that have relatively dry climate - therefore, the relative drought tolerance of a tree species should be one of the criteria used when selecting trees for tree planting projects, especially if no irrigation system will be installed as part of the project
3. Soils in much of urban Honolulu are plastic clays, which are less than ideal for the vigorous root growth that is required for street trees to attain their species-specific mature canopy volume – species adaptability to these types of soils should be an important criterion during species selection
4. Very few native Hawaiian tree species are used as street trees – a few more species of Polynesian origin can be found in significant quantities in the street tree population – more research is required to develop more native tree species or cultivars of native tree species for use in street tree plantings
5. There is only one species considered a “Major Pest” on the “Official Street Tree List” – therefore, the issue of invasive species does not appear to be a significant problem at this time with regard to the street tree sector of the Honolulu Urban Forest

Existing Street Tree Population Profile

Chapter 3.00 of Volume I is dedicated to a discussion of the “Existing Street Tree Population Profile”. An assessment of the existing street tree population of urban Honolulu was conducted in 1999-2000. A total of 51,443 street trees were assessed and characterized. A complete discussion of the methodology used in that assessment and definitions of each of these characteristics and the values that were used for the assessment can be found in Appendix A of Volume III of this Report. Documented tree characteristics include:

1. Tree Species (See Section 3.01)
2. Tree Condition (See Section 3.02)
3. Tree Size (See Section 3.03)
 - a. DBH (See Part A of Section 3.03)
 - b. Height (See Part B of Section 3.03)
 - c. Canopy Spread (See Part C of Section 3.03)
4. Maintenance Need (See Section 3.04)
 - a. Planting (See Part A of Section 3.04)

- b. Pruning (See Part B of Section 3.04)
- c. Removals and Replacement (See Part C of Section 3.04)

Collected data was compiled, sorted and analyzed for the purpose of evaluating the biological and physical condition of the street tree population.

The most significant findings of this Chapter are as follows:

1. The documented street tree population of urban Honolulu is very diverse – there are 226 species found in the population (a full listing of all species and their respective quantities can be found in Appendix B of Volume III of this Report)
2. However, a few species exceed the ISA Diversity Formula guidelines – they are Coconut Palms, Rainbow Shower trees, and Pink Tecoma tree
 - a. Within each Council District the number of species that exceed these diversity guidelines is greater than that found in the overall street tree population (See Appendix B)
3. There is significant variation in species distribution between City Council Districts (a full listing of all species and their respective quantities for each Council District can be found in Appendix B of Volume III of this Report)
4. Overall the street tree population has a relatively high condition rating – approximately 70% of the trees are in Good condition
5. There are 2400 Poor condition trees that should be further evaluated to determine if they should also be replaced - this is because a tree rated in poor condition is often considered beyond remedial care and scheduled for removal and replacement
6. There are 11,000 trees in Fair condition that should also be inspected more closely to determine what type of corrective action should be undertaken to improve their condition
7. The overall street tree population is small in stature
 - a. Approximately 50% of the street trees are six (6) inches or less in DBH – conversely only 6% are over 18 inches in DBH
 - b. Approximately 50% of the street trees are 15 ft. or shorter in Height – conversely only 17% are over 30 ft. in height (3% are over 45 ft. tall and these are primarily Coconuts and a “grove” of Ironwoods)
 - c. Approximately 67% of the street trees are 15 ft. or less in Canopy Spread – conversely only 6% are over 30 ft. in Canopy Spread (and these are primarily Monkey Pods)
8. There are three primary significant documented Maintenance Needs
 - a. There is a very large number of vacant planting sites that need to be planted with street trees, but as discussed in Chapter 1.00, a very large majority of these are three (3) ft. or less in width
 - b. There is a very large number of trees that need a Training Prune – this will become even a more significant maintenance need once a more aggressive tree planting program is implemented (See Chapters 4.00 and 5.00 of Volume II of this Report)
 - c. There is a significant number of street trees that should be scheduled for some type of Corrective Prune – this includes most of the trees documented as being in Fair

Condition and all of the trees documented in Poor Condition that will not otherwise be scheduled for removal and replacement

Existing Policies, Regulations, Guidelines and Administration

Chapter 4.00 of Volume I is dedicated to a discussion of the “Existing Street Tree Population Profile”. This Chapter is devoted to a review and analysis of the existing policies, regulations and guidelines used by the various City and County of Honolulu agencies to guide the performance of the following street tree planning and management related tasks. In its simplest form, street tree activities can be broken down into the following basic functions:

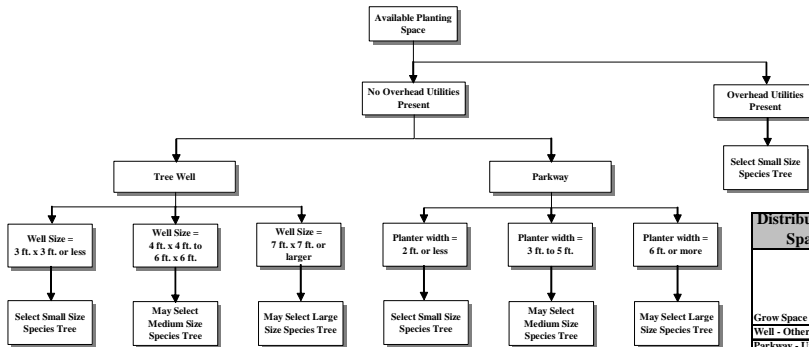
- Tree Protection (See Section 4.02)
- Tree Removal & Replacement (See Section 4.03)
- Street Tree Planting (See Section 4.04)
- Street Tree Maintenance (See Section 4.05)

The most significant findings of this Chapter are as follows:

1. **No Single Document (e.g., Tree Ordinance) that contains a complete set of policies, regulations, guidelines and standards related to street tree management** - These policies, regulations and guidelines are not contained in a single document that can be easily disseminated to practitioners within all of the functional areas
2. **There are disagreements about the content of existing policies, regulations, guidelines and standards** - There are unresolved disagreements about the policies, regulations, standards and guidelines amongst the various departments that currently administer the functions associated with Street Tree Planning and Management
3. **There are functions that have not to date been adequately prescribed** - Not all of the functions are adequately prescribed within the existing documents
4. **There is inadequate or inappropriately located authority & enforcement** - There does not appear to be adequate authority or enforcement procedures or resources to ensure compliance with the existing policies, regulations, standards and guidelines

VOLUME II: STREET TREE MANAGEMENT PLAN RECOMMENDATIONS

Tree Selection Flow Chart



Planting Stock	Installed By	Small Size Species		Medium Size Species		Large Size Species		Totals All Species Sizes	
		No.	Unit Cost	No.	Unit Cost	No.	Unit Cost	No.	Cost
5 gal.	Contract		\$45	\$0	\$45	\$0	\$45	\$0	\$0
5 gal.	Staff	68	\$39	\$2,653	\$39	\$0	\$39	\$0	\$2,653
15 gal.	Contract	19	\$120	\$2,252	28	\$120	\$3,375	\$120	\$0
15 gal.	Staff	56	\$100	\$5,631	84	\$100	\$8,437	\$100	\$0
25 gal.	Contract	61	\$300	\$18,325	4	\$300	\$1,126	7	\$300
25 gal.	Staff		\$282	\$0	\$282	\$0	\$282	\$0	\$0
Totals		204		\$28,861	116		\$12,938	7	\$2,116

Average Unit Cost to Plant a Street Tree in Council District 3 = **\$134**

Maintenance Activity	Size Class	Quantity	Unit Cost	Total Cost
Removals	00 - 15 ft.	592	\$100	\$59,200
Assume that 100% of these Removals will be done by Contract	15 - 30 ft.	58	\$100	\$5,800
	30 - 45 ft.	17	\$450	\$7,650
	45 - 60 ft.	8	\$775	\$6,200
	>60 ft.	0	\$775	\$0
Total Removals		675		\$78,850
New Planting by Staff	25 gal.		\$282	\$0
New Planting by Contract	25 gal.		\$300	\$0
New Planting by Staff	15 gal.	1600	\$100	\$160,000
New Planting by Contract	15 gal.	600	\$120	\$72,000
New Planting by Staff	5 gal.		\$39	\$0
New Planting by Contract	5 gal.		\$45	\$0
Replacement Planting by Staff	25 gal.		\$282	\$0
Replacement Planting by Contract	25 gal.		\$300	\$0
Total Planting		2200		\$232,000
Cocoon Pruning	All Sizes	5482	\$20	\$109,640
Assume that all Cocoon Pruning will be done through Contract				
Routine Pruning	0-15 ft.	4138	\$25	\$103,450
Assume that 100% of Routine Pruning will be done through Contracts	15 - 30 ft.	8804	\$35	\$308,140
	30 - 45 ft.	4839	\$50	\$241,950
	45 - 60 ft.	556	\$75	\$41,700
	>60 ft.	217	\$90	\$19,530
Subtotal Routine		18554		\$824,410
Corrective Pruning	15 - 30 ft.	6395	No Historical Data	
Assumes that 100% of Corrective Pruning will be performed by Arboriculture Section crews	30 - 45 ft.	1380	No Historical Data	
	45 - 60 ft.	235	No Historical Data	
	>60 ft.	47	No Historical Data	
Subtotal Corrective		8057	\$31	\$248,928
Training Pruning	00 - 15 ft.	16854	\$7	\$112,872
Assumes that 100% of Training Pruning will be performed by Community Forestry Section Staff				
Total All Pruning		48,947		\$1,295,850
Administration				\$225,756
New Community Forestry Section Staffing				\$230,892
Arboriculture Section Staff costs (not accounted for elsewhere in the Work Plan)				\$433,740
Includes two crews dedicated to Emergency Response work, misc. service request calls not already accounted for under Routine Pruning or Corrective Pruning costs, approved root pruning, non-contract park tree pruning, and 3 watering truck drivers. It also includes inspectors required to develop pruning contracts and to monitor the performance of those contracts, as well as inspection time for Special Arboriculture Projects. Does not include Administration or Supervision costs associated with the Botanical Garden Section or the Nursery Section of the Division.				
Total All Activities & Staffing Related to Street Tree Management				\$2,497,088

Distribution of Vacant Planting Sites by Grow Space Type x Grow Space Size x Overhead Utility Type For Council District 3

Grow Space Type	Grow Space Size	Overhead Utility Type							Totals
		None	All	Other	Primary - Other	Secondary - Other	Other		
Well - Other	3 ft.								2
Parkway - Unimproved	5 ft.	2	1	3					17
Parkway - Unimproved	9 ft.	31	46	10					95
Parkway - Improved	2 ft.	1	5						6
Parkway - Improved	3 ft.	10	12						29
Parkway - Improved	4 ft.	2	11						24
Parkway - Improved	5 ft.	2	11						52
Parkway - Improved	6 ft.	3	3						4
Parkway - Improved	8 ft.	2	20	12					54
Parkway - Improved	9 ft.	31	175	11					351
Parkway	1 ft.	10	1						17
Parkway	2 ft.	324	131						575
Parkway	3 ft.	979	385	13					1618
Parkway	5 ft.	20	8						28
Parkway	9 ft.	1	1						2
Asphalt Berm	4 ft.	2	1						3
Totals		1427	819	63	4	12	554		2879

Use Small Size Species in these locations
 Use Medium Size Species in these locations
 Use Large Size Species in these locations



Year	Projected Yearly Work Plan Costs	% Cost Increase	No. of Street Trees Maintained	No. of Public Street Tree Sites	Cost per Street Tree	Cost per Street Tree Site	Per Capita Maintenance Cost
2004	\$2,497,088		51,443	74,909	\$49	\$33	\$3
2005	\$2,521,961	1%	53,643	74,909	\$47	\$34	\$3
2006	\$2,839,273	13%	56,108	74,909	\$51	\$38	\$4
2007	\$3,234,668	14%	59,850	74,909	\$54	\$43	\$4
2008	\$3,536,721	9%	64,469	74,909	\$55	\$47	\$4

At-A-Glance

It is expected that many different stakeholders of the Honolulu Urban Forest will want to access and utilize information in specific sections of this Plan. To assist these stakeholders in quickly locating the information that they need, this Plan provides the following directions to critical Chapters and Sections of this Report. The directions are organized by the task for which the stakeholder needs assistance:

PROHIBITED ACTS

Specific acts with regard to Protected Trees (See List of Definitions) are listed on page 151 of this Report (Section 2.03 “Prohibited Acts” of Volume II of this Report)

PREPARATION OF TREE PLANTING PLANS

For those professionals responsible for the preparation of Street Tree Planting Plans please go to Section 4.09 on page 216 in Volume II of this Plan. Use the Street Tree Planting Plan Review Checklist as a guide during the preparation of your Plan Package.

It is also strongly recommended that you thoroughly review the following Sections and Appendices in this Plan:

- Section 4.03 “Tree Selection Criteria”
- Section 4.07 “Street Tree Planting Specifications” before preparing your Plans
- Appendix E “Existing Department of Planning and Permitting (DPP) Urban Design Branch Street Tree Review and Approval Procedures, March 1999”
- Appendix F “Existing DPP Guidelines and Instructions for Filing Minor Special District Permit for Removal of Trees (Land Use Ordinance Sections 7.20 through 7.90)”
- Appendix I “Sample ‘Specifications for Acceptance of Nursery Trees at the Time of Delivery”
- Appendix J “Guide for Developing Planting Specifications”

REQUIREMENT AND DIRECTIONS FOR PREPARATION TREE PROTECTION PLANS

Tree Protection Plans are required for any off-site or on-site property development or improvement project if any activity is within the dripline of a “Protected Tree” (See List of Definitions). For those City and County Department staff (DPP, DDC, DFM, DTS, and DPR) and other professionals responsible for any such projects in any way, please refer to Chapter 2.00 “Tree Protection Program” in Volume II of this Report. This Chapter specifies the required elements of Tree Protection Plans and the procedures to follow to once a Tree Protection Plan has been approved.

The Division of Urban Forestry in DPR must approve all required Tree Protection Plans, and has the primary responsibility (along with the Project Arborist – See List of Definitions) for ensuring that all provisions of this requirement are met.

Section 2.10 of this Chapter on page 164 contains a Tree Protection Plan “Inspection Schedule”.

REQUIRED TREE REMOVAL AND REPLACEMENT PROCEDURES

Tree removal is a highly restricted activity. Any property owner wishing to remove Protected Tree (See List of Definitions) must adhere to the guidelines and procedures contained in Chapter 3.00 Tree Removal and Replacement Program. Similarly, any City staff in any Department responsible for a project or activity in which tree removal is desired must adhere to the same guidelines and procedures. The Division of Urban Forestry in DPR is responsible for ensuring that these guidelines and procedures are strictly followed.

Executive Summary

Volume II of the TUFMP Phase II Report is devoted to “Street Tree Management Plan Recommendations”. These Recommendations are divided into Long Term (period greater than five years) and Short Term (five year period). Chapter 1.00 of this Volume contains the discussion of the Long Term Goals and Objectives. Chapters 2.00 through 6.00 of this Volume contain the presentation of the “Short Term” plans and programs. Chapters 2.00 through 5.00 cover recommendations for the four (4) major street tree management functions as follows:

- Tree Protection (Chapter 2.00)
- Tree Removal and Replacement (Chapter 3.00)
- Tree Planting (Chapter 4.00)
- Tree Maintenance (Chapter 5.00)

The last Chapter of this Volume, Chapter 6.00 presents the “Five (5) Year Work Plan” based on the recommendations from the other four (4) Chapters. The following is a summary of the Recommendations contained in these Chapters.

Long Term Goals and Objectives

Chapter 1.00 of Volume II is devoted to a presentation of long term goals and objectives. Long Term Goals and Objectives establish the context in which to place the short term remedies. They should be consistent with an overall vision for urban forest management in the City and County of Honolulu. The proposed “Vision” (See Section 1.01 for a full discussion of the Vision Elements) includes the following elements:

- A continual enhancement of the stature and overall health of the urban forest
- A strong and continuing presence of the urban forest in all neighborhoods of Honolulu
- A maintenance program that maximizes the environmental, aesthetic, and psychological benefits of the urban forest
- The preservation of the elements of the Honolulu urban forest that contribute to the unique tropical paradise environment long associated with Hawaii

Using these measures this Report recommends using the following goals (See Section 1.03 for a full discussion of each of these Goals) as the basis for the remaining remedies and work plans of this Phase II Report:

1. Canopy Cover – the goal is to increase the canopy cover to the maximal sustainable level possible within the available tree growing space.
2. Condition – the goal is to increase the percentage of trees that are considered in Good condition in the entire street tree population to 80%
 - a. No species should have a Good condition rating for its population fall below 70%.
 - b. All Dead trees should be removed and replaced within 30 days of being identified as such

- c. All Poor condition trees should be removed and replaced within 90 days of being identified as such
- d. All Fair condition trees should be monitored and maintained with a Corrective Pruning Specification appropriate for the particular species
 - i. A Corrective Pruning Schedule can apply to one or more tree species.
3. Presence of diseases and pests should be identified as they appear in individual trees – such data should be monitored as a separate map layer within the City’s Arc GIS
4. Species Diversity – the goal is to maintain an adequately diverse street tree population
 - a. In practice this means adherence to ISA Diversity Guidelines

Long Term Programs (See Section 1.04 for a presentation of these Programs) for each of these Goals are presented, as well as measures (See Section 1.02 for a full discussion of these measures) to monitor the progress being made to achieve each of these Goals.

Tree Protection

Chapter 2.00 of Volume II is devoted to a presentation of a Tree Protection Program that includes the following:

1. A list of specifically “Prohibited Acts” (Section 2.02) with respect to “Protected Trees” (See List of Definitions)
2. A discussion of when “Tree Protection Plans” are required (Section 2.03)
3. A presentation of the “Elements” of a Tree Protection Plan (Section 2.04)
4. A presentation of how Tree Protection should be administered (Section 2.10) that includes an “Inspection Schedule” that must be followed for each approved Tree Protection Plan
5. A discussion of construction activities and demolition activities that can take place around trees and the limitations on how these activities should be conducted (Section 2.07)
6. A presentation of recommended measures for injury mitigation (Section 2.08) for particular types of injuries that could take place during construction activities
7. A discussion of recommended procedures for removing a replacing sidewalk, alternative methods to root pruning and recommended planting practices to use to avoid hardscape conflict with tree roots (Section 2.09)

The major Tree Protection Program recommendations include:

1. Tree Protection Plans should be required for any off-site or on-site property development or improvement project if any activity is within the dripline of a “Protected Tree”
2. These plans should be prepared by a certified arborist to assess impacts to trees; recommend mitigation to reduce impacts to a less than significant level and identify construction guidelines to be followed through all phases of a construction project
3. Each tree protected through the Tree Protection Plan will have a designated TPZ identifying the area sufficiently large enough to protect the tree and roots from disturbance

4. Improvements or activities such as paving, utility and irrigation trenching and other ancillary activities should occur outside of the TPZ, unless authorized by the City Arborist, or by project approval
5. Authority for administering the Tree Protection Program resides with the Department of Parks and Recreation (DPR) Division of Urban Forestry
 - a. All Tree Protection Plans must be reviewed and stamped by the Community Arborist assigned to the Council District in which the project requiring the Tree Protection Plan is located
 - b. Such plans should be approved prior to the issuance of a building permit and/or street usage permit

Tree Removal and Replacement

Chapter 3.00 of Volume II is devoted to a presentation of a Tree Removal and Replacement Program. As previously documented (See Chapter 3.00 of Volume I “Analysis of Existing Conditions” of this Report), there are no uniform regulations or standards that adequately address the issue of tree removal and replacement. There are a number of valid reasons for removing and replacing existing trees, including Protected Trees. HOWEVER, there must be uniform procedures in place to ensure that such trees are only removed and replaced after a thorough evaluation of the existing tree and its planting location.

The provisions of this portion of the Management Plan are intended to meet three primary objectives:

1. To remove and replace all existing stumps, dead and poor condition trees as quickly as possible with trees best suited for those newly vacated planting sites.
2. To minimize the unauthorized and unnecessary removal of trees found to be in ‘Fair’ condition or better.
3. To adequately define uniform procedures for:
 - a. Determining that a tree needs to be removed
 - b. Obtaining permission to remove the tree and
 - c. Determining the location, size and species of the replacement tree

The following types of removals are not allowed:

1. An Exceptional Tree unless it has been designated a “Hazardous Tree” that requires removal as the only “safe” and acceptable mitigation as documented by a Tree Report
2. Street Trees in Fair or better condition unless it is deemed a detriment to or unacceptably crowding an adjacent Protected Tree as documented in a Tree Report
3. Any Protected Tree unless it has been designated a “Hazardous Tree” that requires removal as the only “safe” and acceptable mitigation as documented by a Tree Report

The following types of removals are allowed, but only if they are documented by a “Tree Report” prepared by a Certified Arborist:

1. Stumps
2. Dead trees

3. Street trees in 'poor' condition, unless it is an Exceptional Tree that can be sustained in a relatively safe manner through the use of such treatments as described in Appendix P ANSI A-300 Part 3 "Cabling, Bracing and Guying Standard Practices" and Appendix Q "Best Management Practices – Tree Support Systems: Cabling, Bracing, and Guying"
4. Street trees that are deemed a detriment to or unacceptably crowding an adjacent Protected Tree as documented in a Tree Report
5. A Protected Tree with a trunk that is touching or has a basal flare under the building footprint of an existing building (e.g., uplifting a foundation, contact or damage to eaves, gutter, etc.) and presents a documented hazard that could result in the failure of the building or portion thereof
6. A Protected Tree that has been declared hazardous (this presumes that there are 'Targets' that could be harmed if the tree or portion of the tree were to fail) and beyond mitigation

Tree Planting

Chapter 4.00 of Volume II is devoted to a presentation of a Tree Planting Program designed to aggressively, but "appropriately" plant street trees in 17,000 documented vacant planting over the next five (5) years.

As was discovered in the Analysis of Existing Conditions (See Volume I) there are a very large number of available planting spaces along the public streets of the City and County of Honolulu. Given the very high percentage of vacant street tree planting sites relative to the total number of street tree sites in urban Honolulu, the development of an aggressive "Street Tree Planting Program" has been a very high priority within this TUFMP Phase II Report. Chapter 4.00 lays out just such a Program. It is responsive to the documented existing conditions that require remedy (See Section 4.02). It is based on a rationale street tree selection process and set of criteria (See Section 4.03). It is "community-based" (See Section 4.04). It respects existing fiscal restraints (See Section 4.05). It provides additional tools for professionals responsible for planning for designing, installing and maintaining street trees (See Sections 4.03, 4.06, 4.07, and 4.08). Finally, it provides for the necessary review to ensure that only the right tree is planted in the right place using the right methods.

The primary problem is that not enough appropriate trees are being planted in the available planting spaces. Therefore, the first few Sections of this Chapter present new Tree Selection Criteria and a methodology for applying that criteria to select down to a group of species that is appropriate for the available planting spaces to be planted.

After that several Sections are devoted to the outline of the Community Planting Program, and the associated administration, that will implement the Program to aggressively plant and average of 3400 street trees per year over the next five (5) years. This includes a series of tables for each Council District that illustrates how the Tree Selection Criteria presented in the earlier Sections is used to develop the appropriate "Size Species" for each of the types of planting environments that have been documented by within the street tree inventory data base.

The Chapter concludes with several short Sections that present the following:

- Section 4.06 Tree Canopy Replacement Standard for Onsite Tree Replacement – this Section presents the standards to use when replacing a Protected Tree (See Chapter 3.00 Tree Removal and Replacement)
- Section 4.07 Tree Planting Specifications – this Section provides a brief discussion of tree planting specifications and an explanation of how to use the “guidelines” found in Appendix J “Guide for Developing Planting Specifications”
- Section 4.08 Proposed Revisions to Street Tree Planting Standards – this is a brief discussion and presentation of proposed revisions to the Street Tree Planting Standards
- Section 4.09 Planting Plan Review and Approval Process – a brief discussion of how review of street tree planting plans will be conducted now that the Division of Urban Forestry will be given the opportunity to review all such plans, regardless of their point of origin

Tree Maintenance

Chapter 5.00 of Volume II is devoted to a presentation of a Street Tree Maintenance Program. The primary street tree maintenance function is tree pruning. Currently, very little emphasis is placed on two key types of pruning – Training Pruning and Corrective Pruning. The principle pruning recommendations in this Chapter are therefore that street tree pruning schedules be developed that specifically target segments of the street tree population for either a Training Prune or a Corrective Prune. These practices are described in detail in Section 5.07 Part A.

The other key maintenance need for which an entire Chapter was devoted – Street Tree Planting – requires a dedication of new staff resources to implement the recommended Street Tree Planting Program described in Chapter 4.00. The additional resources and the reallocation of existing resources necessary for this Program and all of the other new Programs described in Volume II are described in Section 5.02. The major recommendation is that a new Community Forestry Section be created within the Division of Urban Forestry with the following responsibilities:

1. Preparation of the Community Programs that will guide the long term activities of the Division of Urban Forestry – See Chapter 1.00 of Volume II
2. Review of all street tree planting plans submitted from or originated from any of the following sources:
 - a. City Departments including, but not limited to: DPP, DDC, DTS, DFM
 - b. Developers
 - c. Residents
 - d. Community-based Organizations
3. Review of all Tree Protection Plans submitted as part of
 - a. street improvement projects
 - b. sidewalk reconstruction projects
 - c. private property projects that contain Tree Protection Plans for adjacent Exceptional Trees and/or Street Trees

4. Conducting or supervising preparation of Hazard Tree Evaluations required for all Tree Removal and Replacement permit requests or interdepartmental Tree Removal and Replacement requests
 - a. These Evaluations may be prepared by Project Arborists as part of their preparation of Tree Protection Plans or as a separate task related only to a Tree Removal & Replacement consultation
5. Coordination of street improvement projects within Special Design Districts
6. Community Outreach and Education required for community-based street tree planting projects

All of the Work Management recommendations are outlined and described in Section 5.02. The reporting requirements are specified in Section 5.03. The required information system needed to monitor progress on the implementation of the Work Management program is described in Section 5.04 and the necessary integration with the City's GIS is outlined in Section 5.05.

Street Tree Five (5) Year Work Plan

Chapter 6.00 of this Volume is devoted entirely to the Street Tree Five (5) Year Work Plan. The following is a list of these Goals and the Steps taken in the Work Plan to implement each of these Goals:

Goal 1 Make substantial progress towards fully stocking all of the available and viable planting spaces along the public streets of the City and County of Honolulu

Step 1 - Create the Community Forestry Section within the Division of Urban Forestry and staff with one (1) Community Forester and two (2) Community Arborists to begin the development of a more aggressive Community Tree Planting Program

Step 2 - Within Year 1 of the Work Plan utilize the newly deployed Street Tree Asset Management System and its link to the City's ArcGIS to prepare Community Tree Planting Plans for each City Council District

Step 3 - Staff and dedicate one (1) Tree Planting Crew within the new Community Forestry Section in Year 1 of the Plan and a second Tree Planting Crew by Year 3 of the Plan

Step 4 - Dedicate two (2) Training Prune Crews within the new Community Forestry Section in Year 1 of the Plan

Step 5 - Reallocate the second Training Prune Crew to Routine Pruning by Year 4 of the Plan once the backlog of Training Prunes have been completed. This will add a crew to handle the substantially increased work load of Routine Prunes that is expected by that time.

Goal 2 Make substantial progress towards increasing the canopy cover per public street tree maintained in the City and County of Honolulu

Step 1 - Have the Community Forester and Community Arborists institute the Training Prune Program as noted in Goal 1 above, the objective of which is to improve the structure of young trees to allow their respective canopies to

grow naturally full with structural integrity. This will minimize the necessity to reduce canopy later to reduce structural hazards.

- Step 2** - Have the Community Forester and Community Arborists identify species that do not require yearly tree pruning and lengthen the pruning cycle on trees of those species
- Step 3** - Plant as many “medium size” species in the available planting spaces as possible – limit the planting of “small size” species trees to planting spaces under overhead utilities and in planter strips less than three (3) ft. wide
- Goal 3** Ensure that the existing street tree and Exceptional Tree resources are fully protected against loss due to construction or other impacts
 - Step 1** - Have the Community Forester and Community Arborists administer and enforce the Tree Protection and Tree Removal and Replacement recommendations of this Management Plan
- Goal 4** Ensure that the more restrictive Tree Removal and Replacement recommendations of this Management Plan are administered properly and that all trees that must still be removed are replaced within the same year in kind and value
 - Step 1** - Have the Community Arborists enforce the requirement that any request for a Removal be accompanied by a Hazard Tree Evaluation and Tree Replacement Report as outlined in Chapter 5 Tree Removal and Replacement of this Management Plan
- Goal 5** Ensure that the backlog of Training Prunes are addressed as soon as possible
 - Step 1** - Staff the new Community Forestry Section with two (2) dedicated Training Prune Crews
- Goal 6** Implement a Corrective Prune Program to correct as many structural defects in the existing street tree population as possible
 - Step 1** - Dedicate two (2) Corrective Prune Crews within the Arboriculture Section of the Division of Urban Forestry
- Goal 7** Implement administrative procedures that assures that only the “right tree is planted in the right place”
 - Step 1** - By creating the Community Forester and Community Arborist positions the Plan has dedicated resources to review all tree planting plans regardless from where they originate, and as per the recommendations of Chapter 6 Street Tree Planting Plan
 - Step 2** - These recommendations make it mandatory that the Division of Urban Forestry review all such plans – this includes Street Tree Planting Plans for projects being managed by other City and County Departments
 - Step 3** - Use the new Street Tree Selection Criteria found in Chapter 6
- Goal 8** Accomplish all of the above as cost efficiently as possible
 - Step 1** - Continue to use contractors to perform the Coconut Pruning and the Routine Pruning

- Step 2** - Deploy the new Street Tree Asset Management System prior to implementation of the Year 1 Work Plan
- Step 3** - Utilize this new System to prepare Work Orders/Schedules for both contract crews and in-house crews dedicated to Training Pruning and Corrective Pruning so that this work is performed in a proactive manner rather than a less efficient reactive manner
- Step 4** - Ensure that these Work Orders/Schedules are available to administrative staff fielding service request calls so that callers can be informed immediately when their trees are scheduled for street tree maintenance activities
- Step 5** - Identify tree species that do not need yearly Routine Pruning – the goal is to move 25% of the street tree population away from yearly pruning to at least every other year Routine Pruning
- Step 6** - By implementing the Training Prune Program more trees will grow in a structurally sound way that minimizes the need for more frequent Routine Pruning
- Step 7** - By creating the Community Forester and Community Arborist positions, there are dedicated resources to ensure that only the right trees are planted in the right place – that is large or medium size trees are not planted under overhead utility lines that will require more costly pruning as they mature

Though the recommendations in the Honolulu Tropical Street Tree Management Plan will result in greater overall cost to manage the street trees of Honolulu, the performance of this sector of the Honolulu Urban Forest is greatly enhanced. Moreover, as will be seen below, the actual cost increase to Street Tree Maintenance will just about keep pace with cost of living increases when measured as a per street tree cost.

Yearly Work Plan Cost Comparison Matrix							
Year	Projected Yearly Work Plan Costs	% Cost Increase	No. of Street Trees Maintained	No. of Public Street Tree Sites	Cost per Street Tree	Cost per Street Tree Site	Per Capita Maintenance Cost
2004	\$2,497,088		51,443	74,909	\$49	\$33	\$3
2005	\$2,521,961	1%	53,643	74,909	\$47	\$34	\$3
2006	\$2,839,273	13%	56,108	74,909	\$51	\$38	\$4
2007	\$3,234,668	14%	59,850	74,909	\$54	\$43	\$4
2008	\$3,536,721	9%	64,469	74,909	\$55	\$47	\$4