City of Colton
Urban Forest Management Master Plan

Jack Sahl & Associates

January 12, 2018

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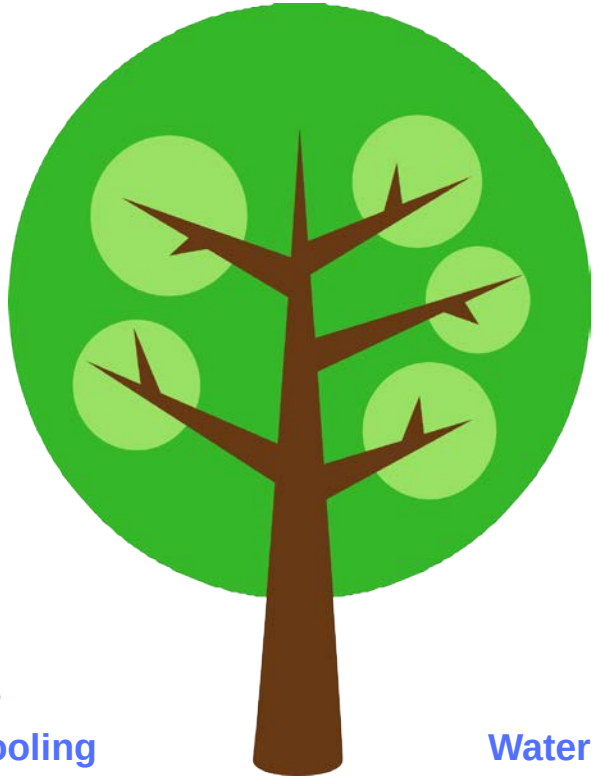
Inspire Healthier Communities

Beautify Communities

Filter Air Contaminants



Reduce Sound & Noise

Save Energy

Increase Property Value

Increase Retail Business

Provide Shade & Cooling

Collect Water & Storm Runoff

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City of Colton Urban Forest Management Master Plan

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(*American National Standards Institute A300*)

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American National Standards Institute, Inc. www.ansi.org

1899 L Street, NW – 11th Floor
Washington, DC 20036

Tree Care Industry Association, Inc. www.tcia.org

136 Harvey Road – Suite 101
Londonderry, NH 03053

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1.0 Community Summary & Recommendations

The goals for this project and the implementation of the City of Colton Urban Forest Management Master Plan are to create and implement a plan to:

1. Improve Colton's urban forest by increasing the number of trees, increase tree canopy, increase tree species diversity, and strengthen the management, maintenance and stewardship of Colton's trees (i.e., public-trees on City property, street median and parkways, City parks, and natural and open spaces; and private-trees on residential and business property);

2. Integrate Colton's Urban Forest Management Master Plan with broader City-wide planning, storm water management, waste water management, public health, transportation, and sustainability initiatives;

3. Engage the community and promote Colton's trees to support the Master Plan and increase public appreciation of the wide-spectrum of aesthetic, energy and water conservation, health, business, and property value benefits from public and private trees.

Colton's Tree Canopy, from both Public and Private Trees is at 6% (assessed using satellite images and counting sample images – from i-Tree Canopy (www.itreetools.org) (Table 3 and Attachment 3). This existing canopy provides significant benefits, ranging from the removal of air contaminants and the capture of greenhouse gases. The cumulative storage of greenhouse gas in Colton's existing tree canopy is estimated at a value of $2,841,045 (Table 4/Attachment 2).

When focusing on Colton's public trees, there are over 6,185 trees, with total annual benefits of $763,885 and with a total replacement value of $17,827,692 (Table 4 and Attachment 2). While these valuations do not capture all the benefits, nor account for all the costs, they do provide useful information to help establish tree maintenance programs to protect the existing trees and the ongoing investments in new trees.

Colton's Urban Forest Management Master Plan is to:

1. Take Care of Colton's Existing Trees;
2. Select, Plant and Care for Additional Trees;
3. Engage the Colton Community;
4. Align with Colton's Priorities and Optimize Resources.

Tree maintenance is essential to maintain the health of Colton's trees and protect public safety. This plan includes a recommended Tree Maintenance Program based on holistic and adaptive tree management best practices. A planning tool has been developed to assist with the budget process (see Models 1). When planning for future tree maintenance budgets, funding should be targeted to:

1. Address back-log of tree maintenance requirements;
2. Emergency tree maintenance;
3. On-going (focus on specific city areas and cycle through every 4 years).

The Colton Tree Palette should be adopted and used by the City of Colton departments, planners, developers, landscape architects, urban foresters, business and residents in selecting and locating trees in Colton. Colton's Tree Palette includes a wide range of trees that have been identified to help achieve City of Colton's urban forest management vision, goals and objectives (Table 6 and Attachment 4).

Colton's Urban Forest Management Master Plan encourages planting additional trees. There is no 'best' number of trees or percent canopy cover for every city. By understanding what the current situation is, recognizing the potential benefits from trees, and factoring in the costs associated with trees, Colton can set tree planting targets, make plans and allocate resources to achieve a healthy and resilient urban forest. If trees are properly selected, located, planted and maintained, they can provide community benefits well into the future – hundred-years plus.

The Community Outreach & Education Plan helps to explain the overall approach, motivates buy-in to support City urban forest activities, and to better understand the benefits of a healthy, resilient urban forest. In combination, this will inspire residents and business to select, plant and care for trees on their property. The 'City of Colton Urban Forestry Management Master Plan' is stronger and becomes viable with the engagement of the entire Colton Community (see Attachment 7). The Colton residential and business community can utilize the 'Colton Community Tree Palette' and 'Public Space Planting Guide' to select, care for and maintain trees on their property.

Colton's Tree Management Master Plan is aligned and supports a wide range of civic priorities. This alignment also provides a path forward to optimize resources and focus on community priorities.

City wide planning provides the framework to evaluate options, gain input from the community, understand resource requirements, and prioritize projects to move forward in a systematic fashion. The guiding principles for City of Colton's Urban Forest Management Master Plan are to:

1. Align with Colton's General Plan and Ordinances;
2. Support Colton's governance (e.g., Planning Commission);
3. Augment Colton's 'Cleaner Greener Community' initiatives;
4. Driven by engagement and dialogue with citizens and business;
5. Deliver value across the community over the near-term and long-term;
6. Focus on creating healthy trees and resilient ecosystems;
7. Supports public health and safety;
8. Results in co-benefits in electricity, water, wastewater, and storm-water efficiency;
9. Incorporates tree- and urban forest-Best Management Practices.

Planning for a resilient urban forest for Colton is a good start towards achieving a wide range of benefits for the City, residents, and the local business community. However, these benefits are only realized when specific responsibilities are assigned to City personnel and adequate resources allocated to ensure effective and ongoing implementation. Adopting specific performance goals and tracking progress is essential to achieve lasting success. This requires ongoing community engagement and support for Colton's trees and the thriving urban forest.

2.0 Growing Colton's Trees – Healthy, Resilient & Valued

The goals for this project and the implementation of the City of Colton Urban Forest Management Master Plan are to create and implement a plan to:

4. Improve Colton's urban forest by increasing the number of trees, increase tree canopy, tree species diversity, and strengthen the management, maintenance and stewardship of Colton's trees (i.e., public-trees on City property, street median and parkways, City parks, and natural and open spaces; and private-trees on residential and business property);

5. Integrate Colton's Urban Forest Management Master Plan with broader City-wide planning, storm water management, waste water management, public health, transportation, and sustainability initiatives;

6. Engage the community and promote Colton's trees to support the Master Plan and increase public appreciation of the wide-spectrum of aesthetic, energy and water conservation, health, business, and property value benefits from public and private trees.

Colton's Trees Delivering Value

Colton's trees are beautiful. They also provide additional tangible benefits. Colton's trees and the urban forest helps to ensure public health, business vitality, environmental quality, water conservation, social equity, improved livability, and enhance public safety. Taken together, the public trees in parks, on City property, in natural areas (e.g., arroyos and riverbeds), and those that line Colton's streets comprise a significant portion of Colton's 'urban forest'. Colton's urban forest also includes privately owned trees and vegetation on residential and business property. Importantly, these public and private trees create an ecosystem that is connected to each neighboring city, the larger San Bernardino County, neighboring Riverside and Los Angeles Counties, the State of California and the region's four national Forests – Santa Rosa, Cleveland, San Bernardino, and the Angeles (including the San Gabriel Mountains National Monument). Taken together, Colton's trees are an essential contributor to the regional urban forest and help to make Colton a healthy, beautiful, vibrant and resilient community.

Tree Canopy Vision and Mission

Colton's Urban Forest Management Master Plan helps to achieve Colton's Vision and implement the Mission to deliver real near-term and long-term value for the entire community – residential and business.

City of Colton's Vision Statement

> Colton's vision for our urban forest is a sustainable and resilient mix of healthy trees throughout our public parks, avenues, parkways, arroyos, rivers and open spaces. Colton's trees provide residents and the business community with beauty, shade, comfort, health and economic benefits. Colton's trees are cared for, valued, and protected by the City and its citizens as a treasured community asset.

Colton's Tree Management Mission Statement

City of Colton's mission is to sustain a healthy and resilient urban forest, that will:

1) Thrive: Trees are carefully planted and cared for;
2) Protect: Trees are protected by holistic best management practices;
3) Nurture: Our community is devoted to the trees in the urban forest;
4) Connect: Trees connect our community, streets, shopping, parks, and open spaces;
5) Be Resilient: Trees are rooted in the larger ecosystem;
6) Be Diverse: Our forest is comprised of multiple species and different age groups;
7) Be Valued: Colton's trees are recognized as essential to our community well-being;

Benefits of Trees

Community benefits from Colton's trees support the 'triple bottom line': economic benefits, environmental benefits, and social benefits. Many of the benefits support two or more of these goals – for example tree leaf structure helps to capture, retain and reduce air contaminants and provides shade for cooling. This delivers benefits for the economy (e.g., reduced health care costs) and the environment (e.g., reduced air pollution). In addition, the shade and aesthetic value can increase foot traffic at retail stores for economic benefit (see tree diagram 'Gaining Benefits from Colton's Trees', Page iv).

'Economic Benefits' include:

- Reduce Air Contaminants
- Increase Green House Gas Retention
- Support Storm Water Infrastructure
- Sound and Noise Reduction
- Increase Energy Conservation/Reduce Urban Heat Island (Heating & Cooling)

'Social Benefits' include:

- Sound and Noise Reduction
- Shade and Cooling
- Encourage Residents to Walk, Bike & Outdoor Play
- Aesthetics: 'Livable City'/ 'Healthy City'/'Vibrant City'

'Environmental Benefits' include:

- Provide Wildlife Habitat
- Reduce Air Contaminants
- Increase Green House Gas Retention
- Support Storm Water Infrastructure

Trees also have costs. They require maintenance, pruning and water. Trees can also impact sidewalks or electric utility lines. The Master Plan includes a Colton Tree Palette, Planting Guide, and Tree Maintenance Best Management Practices that help to alleviate these costs.

City of Colton's Social, Economic and Geographical Context

Colton's roots run deep into Southern California history. At the confluence of north-south and east-west transportation corridors first established by the great transcontinental railroads, and the Santa Ana River watershed, Colton is a true 'cross-roads' community. Framed by the majestic San Gabriel Mountains, with Mount San Antonio rising 10,400 feet to the northwest, San Bernardino Mountains just north, and the Santa Rosa Mountains, with Mount San Jacinto the high point to the east. Southward is the Pacific Ocean, reached by the Santa Ana River. Or travel west through Los Angeles onto the Pacific's Santa Monica Bay.

Colton resides in a classic 'Mediterranean climate zone', that is characterized by mild winters, intermittent rainfall, and hot, dry summers. There are significant coastal influences, but these are moderated by the 60 miles' distance to the Pacific Ocean. The San Gabriel Mountains provide water from Lytle Creek; San Bernardino Mountains provide water from Twin and Warm Creeks, and the San Jacinto mountains provide water via the San Timoteo Creek. The Santa Ana River watershed passes both through, and in the groundwater basins, underneath Colton.

The Colton economy sustains a community of 52,000, with numerous parks, Community Centers, sports fields and libraries. Colton's commitment to urban forestry is borne from a long history of commitment to create and sustain a thriving historic California community.

3.0 City of Colton Urban Forest Management Master Plan

The goals for this project and the implementation of the City of Colton Urban Forest Management Master Plan are to create and implement a plan to:

1. Improve Colton's urban forest by increasing the number of trees, increase tree canopy, tree species diversity, and strengthen the management, maintenance and stewardship of Colton's trees (i.e., public-trees on City property, street median and parkways, City parks, and natural and open spaces; and private-trees on residential and business property);

2. Engage the community and promote Colton's trees to support the Master Plan and increase public appreciation of the wide-spectrum of aesthetic, energy and water conservation, health, business, and property value benefits from public and private trees;

3. Integrate Colton's Urban Forest Management Master Plan with broader City-wide planning, storm water management, waste water management, public health, transportation, and sustainability initiatives.

This plan is directed towards City of Colton's public trees. These are in city parks, property around city buildings, and on the parkways of avenues and residential streets. Private homes and business property also have a significant number of trees. A key element of Colton's Master Plan is to encourage residents and business to select, plant and grow trees to support the wider urban forest. While these private trees are not within the scope of this plan, implementation of Colton's Urban Forest Management Master Plan does help to motivate private involvement (e.g., Community outreach and Colton Electric tree purchase rebate programs).

There are additional trees within natural areas and open spaces (e.g., arroyos and the Santa Ana River). These contribute to the essential quality of Colton's diverse urban forest. While not specifically managed as part of this plan, the holistic approach to Colton Urban Forest helps to achieve co-benefits that may otherwise be missed. While the city limits define the 'action' area for the Colton Urban Forest Management Master Plan, the Southern California urban and environmental setting highlight the opportunities to integrate planning to gain regional value.

This Master Plan is based on a twenty-five-year planning horizon; with reviews, reassessments, and updates needed every ten years, or when other significant events require. Since there is uncertainty about future weather patterns for Colton, it is important to review and update this plan to ensure that the recommended Tree Palette, Tree Planting, and Holistic and Adaptive Tree Maintenance-Best Management Practices remain optimal to deliver real value for both current residents and Colton's future residents.

Colton's Urban Forest Management Master Plan is to:

1. Take Care of Colton's Existing Trees;
2. Select, Plant and Care for Additional Trees;
3. Engage the Colton Community;
4. Align with Colton's Priorities and Optimize Resources.

The City of Colton Urban Forest Management Master Plan is crafted and implemented to ensure that the benefits of healthy trees are enjoyed by all residents and throughout the business community. This is an integral element of the City of Colton broader sustainability initiative (www.coltonca.gov).

Planning provides a framework to evaluate options, gain input from the community, understand resource requirements, and prioritize projects to move forward in a systematic fashion. The guiding principles for City of Colton's Urban Forest Management Master Plan are to:

1. Align with relevant parts of Colton's General Plan and Ordinances;
2. Support Colton's existing governance (e.g., Planning Commission);
3. Augment Colton's 'Cleaner Greener Community' initiatives (e.g., Climate Action Plan);
4. Engage the community through dialogue with citizens and business;
5. Deliver real value across the community over the near-term and long-term.

Take Care of Colton's Existing Trees

Colton's existing trees represents a significant investment by the city, local business, and the residents. Colton's approach for the Master Plan is to first take good care of Colton's existing trees. To facilitate this, we conducted a sample of public trees, we assessed the size of the existing canopy for both public and private trees, and we have outlined a holistic and adaptive tree management program to address both hazard trees and general maintenance requirements.

Colton's Existing Trees – Public Tree Inventory

An inventory based on a sample of Colton public trees was conducted in 2017 (Table 1 and Excel Files, provided on a flash drive). This provides the foundation for the Urban Forest Management Master Plan and the implementation of the Master Plan. The inventory of City trees provides an opportunity to estimate the value of the existing urban forest, model how setting and achieving specific goals can bring additional value, establishes a baseline for the Tree Palette, and establish a holistic and adaptive tree management program.

The inventory utilized protocols presented in the U.S. Department of Agriculture Forest Service (USDA FS) and Davey Institute i-Tree program (www.itreetools.org). This made it possible to assess the value of Colton's trees using the i-Tree Street and i-Tree Canopy suite of tools (www.itreetools.org).

Colton's existing tree inventory includes over 50 species from a wide range of families. This diversity helps to protect against insects or drought damage (see Table 1). Colton's existing trees include a variety of native and non-native species.

Information from this inventory also identified 963 trees that need of maintenance (Table 2). It is recommended that the City implement a tree maintenance program that both catches up on this back log and provides ongoing care as Colton's tree canopy increases (see Holistic and Adaptive Tree Management Best Practices, Appendix 1 -13).

Table 1: Colton Public Tree Inventory - 2017

Rank	Common Name	Count	%	Scientific Name
1	Crepe Myrtle	753	12.2%	Lagerstroemia indica
2	Chinese Elm	511	8.3%	Ulmus parvifolia
3	Fan Palm	478	7.7%	Washingtonia filifera (2 species)
4	Carrotwood	404	6.5%	Cupaniopsis anacardioides
5	Queen Palm	313	5.1%	Arecastrum romanzoffianum
6	Pine	293	4.7%	Pinus (4 species)
7	Ash	263	4.3%	Fraxinus Uhdei
8	London Planetree	258	4.2%	Platanus Hybrida
9	Oak	250	4.0%	Quercus (4 species)
10	Magnolia	249	4.0%	Magnolia Grandiflora
11	Jacaranda	230	3.7%	Jacaranda Mimosifolia
12	Liquid Amber	176	2.8%	Liquidambar Styraciflua
13	Ecupyptus	167	2.7%	Eucalyptus (4 species)
14	California Pepper Tree	166	2.7%	Schinus Molle
15	Privet	160	2.6%	Acacia
16	Callery Pear	141	2.3%	Pyrus Kawakamii
17	Willow	127	2.1%	Pittosporum
18	Australian Willow	127	2.1%	Geijera Parviflora
19	Olive	115	1.9%	Olea europaea
20	California Sycamore	106	1.7%	Platanus Racemosa
21	Ginkgo	84	1.4%	Ginkgo Biloba
22	Brisbane Box	83	1.3%	Tristaniopsis Conferta
23	Laurel	78	1.3%	Laurus Nobilis
24	Mulberry	61	1.0%	Morus Rubra
25	Italian Cypress	58	0.9%	Cupressus Sempervirens
26	Diadora Cedar	49	0.8%	Cedrus Deodara
27	Ficus	42	0.7%	Ficus Species
28	Primrose	40	0.6%	Lagunaria Patersonii
29	Camphor	37	0.6%	Cinnamomum Camphora
30	Carob Tree	37	0.6%	Ceratonia Siliqua
31	Sumac	37	0.6%	Rhus Lancea
32	Palo Verde	34	0.5%	Parkinsonia Aculeata
33	Citrus	32	0.5%	Citrus (2 sp)
34	Majestic Beauty	26	0.4%	Rhaphiolepis
35	Honey Locust	23	0.4%	Gleditsia Triacanthos
	Total:	6,185	97%	

Note:
Colton public trees were sampled in 2016 and 2017 using methods developed by i-Tree (itreetools.org); Sampling protocols will result in error, both in the counts and the tree identification (i.e., 'species'); Under-estiments of tree counts (~5%) is more likely result than over-counting.

Table 1: Colton Public Tree Inventory - 2017, *continued*

Rank	Common Name	Count	%	Scientific Name
34	Majestic Beauty	26	0.4%	Rhaphiolepis
35	Honey Locust	23	0.4%	Gleditsia Triacanthos
36	Fraser Photinia	20	0.3%	Photinia x fraseri
37	Chinese Pistachce	18	0.3%	Pistacia Chinensis
38	Tea Tree	14	0.2%	Leptospermum Species
39	Silk Oak	12	0.2%	Grevillea Robusta
40	Maple	11	0.2%	Acer Oblongum
41	Other Palm	11	0.2%	
42	Weeping Bottle Brush	10	0.2%	Callistemon Viminalis
43	Box Elder	9	0.1%	Acer Negundo
44	Norfolk Island Pine	9	0.1%	Rhopalostylis Baueri
45	African Silk Tree	7	0.1%	Liriodendron Tulipifera
46	Peach	6	0.1%	Prunus persica
47	Cottonwood	5	0.1%	Populus Species
48	White Alder	4	0.1%	Alnus Rhombifolia
49	Other Broadleaf Evergreen	4	0.1%	Large Evergreen
50	Corol Tree	3	0.0%	Erythrina Lysistemon
51	Dogwood	2	0.0%	Cornus Florida
52	Orchid Tree	2	0.0%	Bauhinia Purpurea
53	Robiana	2	0.0%	Robinia Pseudoacacia
54	Western Redbud	2	0.0%	Cercis Occidentalis
	Total:	6,185	3%	

Note:
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Table 2: Colton Tree Care: Missing, Dead & Distressed Trees - 2017

		Colton's Districts				
		Northwest	Historic North	Historic South & Southwest	Cooley Ranch & Recehe Canyon	Total
Condition of Tree	**Missing Street Trees**					
	Major Street Parkways	8	62	13	0	83
	Residential Street Parkways	0	2	20	0	22
	Dead Trees (GT 75% Canopy Loss)					
	Major Streets	0	37	1	2	40
	Parks	7	1	0	0	8
	Residential Streets	0	5	5	1	11
	Distressed Trees					
	Between 50 - 75% Canopy Loss	17	73	2	2	94
	Between 25 - 49% Canopy Loss	9	159	22	4	194
	Between 5 and 24% Canopy Loss	110	381	12	8	511
	Total:	151	720	75	17	963

Colton's Districts: Northwest includes streets North of Valley and West of Pennsylvania
Historic North includes streets North of Valley and East of Pennsylvnia
Historic South and Southwest includes streets South of Interstate 10 and West of the Santa Ana River
Cooley Ranch and Reche Canyon includes streets South of Interstate 10 and East of the Santa Ana River

Note:
Colton public trees were sampled in 2016 and 2017 using methods developed by i-Tree (itreetools.org);
Sampling protocols will result in error, both in the counts and the tree identification (i.e., 'species');
Under-estiments of tree counts (~5%) is more likely result than over-counting.

Specific Benefits from Colton's Trees – Public and Private

The tree leaf represents the surface area that delivers benefits from the Colton's trees. When all the leaves on the trees are considered together, this is the tree canopy cover. Many of the benefits from trees can be determined by the canopy cover across the city. Canopy cover, as a percentage of total land use, provides a single measure to represent the extent of Colton's urban forest. It is valuable since it can be easily measures (from both on the ground tree-inventories and above the ground satellite images), it is easily understood by the general population, and helps to set and track performance goals.

Colton's Tree Canopy, from both Public and Private Trees is at 6% (assessed using satellite images and counting sample images – from i-Tree Canopy (www.itreetools.org) (Table 3 and Attachment 3). This existing canopy provides significant benefits, ranging from the removal of air contaminants and the capture of greenhouse gases. The cumulative storage of greenhouse gas in Colton's existing tree canopy is estimated to have a value of $2,841,045 (Table 4 and Attachment 2).

When focusing on Colton's public trees, there are over 6,185 trees, with total annual benefits of $763,885 and with a total replacement value of $17,827,692 (Table 4 and Attachment 2). While these valuations do not capture all the benefits, nor account for all the costs, they do provide useful information to help establish tree maintenance programs to protect the existing trees and the ongoing investments in new trees.

Tree Maintenance – Holistic and Adaptive Tree Management Best Practices

Tree maintenance is essential to maintain the health of Colton's trees and protect public safety. Colton needs to develop and adopt a Tree Maintenance Program based on holistic and adaptive tree management best practices (see 'Adaptive Tree Management Best Practices' (Appendix 2, 11, 12 & 13). Tree maintenance requires specific skills. All individuals or organizations that provide tree maintenance services should have the necessary training and skills (and maintain certification that they are qualified to follow the American National Standards Institute (ANSI) Adaptive Tree Management Best Practices in the Appendixes).

A planning tool has been developed to assist with the budget process (see Models 1). When planning for future tree maintenance budgets, funding should be targeted to:

1. Address back-log of tree maintenance requirements;
2. Emergency tree maintenance;
3. On-going (focus on specific city areas and cycle through every 4 years).

Budgets should be established and tracked for: Pruning (certified arborist), pest management, irrigation, hazard tree removal, inspection, infrastructure repairs, liter clean-up, and liability/claims. These ongoing costs should be factored into the long-term costs of additional tree planting projects.

Table 3. Colton's Tree Canopy[1]

Tree Canopy	6.01%	(+/- 1.06%)
Grass, Parks, Lawns & Shrubs	16.8%	(+/- 1.67%)
Water/Riverbed	.6%	(+/- .35%)
Streets, Highways, Sidewalks	24.6%	(+/- 1.93%)
Building/Roof	12.2%	(+/- 1.47%)
Soil + Bare Ground	37.5%	(+/- 2.17%)

1. iTree Canopy model based on satellite data (3,000 ground image samples scored)

Table 4. Air Quality Benefits[1] From Colton's Tree Canopy

		Air Quality Improvement (Annual)	
	Benefit Description	Amount Removed	Value (SE)
Air Contamination Removed	Ozone (O3)	15.30 Tons	$2,142 ($379)
	Particulate Matter – PM 2.5	1,487.33 Pounds	$4,428 ($784)
	-- PM 10	5.13 Tons	$1,555 ($275)
	Sulfur Dioxide (SOx)	1,936.72 Pounds	$7 ($1)
	Nitrogen Dioxide (NOx)	1.54 Ton	$41 ($7)
	Carbon Monoxide (CO)	563.62 Pounds	$24 ($4)
			$8,197
Carbon Dioxide Removed	Annually Sequester (CO2)	3,116.24 Tons	$112,681 ($19,945)
		Annual Benefit Total:	$120,879 ($21,395)
	Cumulative CO2 Storage	78,570 Tons	$2,841,045 ($502,867)

1. Benefits calculated using iTree EcoSystem Analysis

Table 5. Benefits[1] From Colton's Public Trees

Benefits Category	Total ($)	$/tree	$/capita	Replacement Value
Energy	$85,043	$14	$2	$1,795,679
CO2	$2,452	$0	$0	$3,917,266
Air Quality	$14,088	$2	$0	$5,454,315
Stormwater	$33,229	$6	$1	$6,660,431
Aesthetic/Other	$629,073	$105	$12	$17,827,692
Total Benefits	$763,885	$128	$15	

1. Benefits calculated using iTree EcoSystem Analysis

Select, Plant and Care for Additional Trees

Colton's Urban Forest Management Master Plan encourages planting additional trees. There is no 'best' number of trees or percent canopy cover for every city. By understanding what the current situation is, recognizing the potential benefits from trees, and factoring in the costs associated with trees, Colton can set tree planting targets, make plans and allocate resources to achieve a healthy and resilient urban forest. If trees are properly selected, located, planted and maintained, they can provide community benefits well into the future – hundred-years plus.

The Right Tree for The Right Place

'Planting the right tree in the right place' provides the best opportunity to gain lasting value from your tree. The following characteristics of each tree should be considered when selecting your tree from the Colton Tree Palette.

1. Soil, sun, moisture conditions;
2. Hardiness to seasonal and extreme weather;
3. Diversity by species/genus;
4. Tree height and canopy spread to avoid interference with nearby infrastructure;
5. Tree planting requirements;
6. Tree maintenance requirements.

Colton soils are derived from Santa Ana River alluvial. According to USDA Soil Conservation Soil Survey maps, Colton's soils consist mostly of gravelly loamy sand (TVC), course sandy loam (HaC), loamy sand (TUB) and fine sandy loam (ScC). The soils increase with gravel in depth. In general, these soils are slightly acid to moderately alkaline, have rapid water permeability, rapid infiltration, low water holding capacity (2"-5" per 60"), and tree roots can grow to depths of five feet and more.

Colton is in the West's Climate Zones 18 (average winter lows are 40^{o} F to 34^{o} F (4^{o} C to 1^{o} C), with an average rain fall of 10.35 inches. Most rainfall occurs between October and March. However, due to climate change, Colton weather is expected to become hotter, dryer and more like Coachella Valley (which is in Climate Zone 13). In the future, Colton can expect to experience average summer highs of 107^{o} F and spikes to 120^{o} F. Winter lows average 40^{o} F, with up to 15 frost nights per year, with rare drops to 27^{o} F to 15^{o} F. The average annual rain fall will be less and occur mostly between October and March.

Southern California's weather is dynamic, with long period of drought. The climate that drives Colton's weather is also changing. Over the next 100 years, Colton can expect higher average temperatures, higher night-time temperatures, lower humidity, more severe weather events (e.g., heat events, drought, and intense rainfall resulting in flooding). In general, Colton's future weather will more closely resemble the current weather for Coachella Valley (eastward). Colton's goals for this Master Plan will be achieved if the new urban forest thrives in the current weather and makes the transition to these future weather patterns. Colton's Tree Palette was selected because these trees can handle this transition.

The resiliency and long-term value from your tree is increased when the urban forest is diverse. This diversity includes planting different genus and species and matching with the wide range of land use within the City of Colton. The diversity of the urban forest helps to protect the health of the forest, reduces the impacts from unexpected tree loss from insects and fungi, and creates additional resilience from changes in weather due to climate change.

Colton adopts the '10-20-30 Rule' for tree diversity as a guide for selecting trees (no greater than 10% of any species, 20% of any genus, or 30% from any family). This diversity will help to prevent catastrophic tree loss due to pests or changed weather patterns. Refer to the Colton Tree Palette and the 2017 Colton Tree Inventory to help make these selections.

Selecting the right tree fits hand-in-glove with planting in the right place. The selected tree(s) need to be compatible with surrounding land uses. This helps to reduce tree maintenance costs and helps to ensure that the mature trees will fit into the neighborhood and bring lasting value to the community. Land use designations within the Colton General Plan guide the selection of specific trees. Colton's Tree Palette includes trees that are suitable across broad land use categories:

1. City Parks
2. City Buildings and Facilities
3. Major Streets (with Retail, Commercial & Industrial Business)
    a. Medians
    b. Parkway
4. Residential Streets
    a. Parkways
5. Private Property
    a. Residential
    b. Business
6. Natural & Open Space

The following potential conflicts should be identified and resolved when screening locations to identify the right place for your tree:

- Roof-top Solar Generation
- Crown Size & Root Damage (e.g., sidewalks & overhead or underground utilities)
- Available Tree Maintenance (e.g., managing Hazard Trees)
- Fire Safety
- Does it drop leaves (e.g., deciduous or evergreen), fruit or flowers?
- Growth rate (i.e., for both the crown and root zone)
- Allergy and Toxicity to people and pets

Adopting best practices for initial planting and care helps to ensure that trees thrive in their new location. Emergency and regular tree maintenance, include hazard tree management, is an essential part of long term success of urban tree planting.

Select Trees from Colton's Tree Palette

The Colton Tree Palette should be used by the City of Colton departments, planners, developers, landscape architects, urban foresters, business and residents in selecting and locating trees in Colton. Colton's Tree Palette includes a wide range of trees that have been identified to help achieve City of Colton's urban forest management vision, goals and objectives (Table 6 and Attachment 4). The 'Tree Palette Selection Criteria' provide a rationale for how trees were selected. The Colton Tree Palette also excludes palm trees, which contribute minimal shade-cooling, air contamination removal, or carbon sequestration. They also require more water than other trees. Eucalyptus trees are also excluded, along with other non-native species.

Trees can be selected from the following categories:

- Broadleaf trees that lose leaves in winter (i.e., deciduous)
- Broadleaf trees that keep leaves in winter (i.e., ever-green)
- Pine (Conifer) trees that are ever-green
- Native trees
- Urban Food Producers

There are Web Sites that can help you to select the right tree and to describe the expected benefits from your tree. These include:

- Urban Forest EcoSystems Institute (Cal-Poly San Luis Obispo University)

  SelecTree (SelecTree.calpoly.edu), a tree selection guide, is an interactive program designed to help you select appropriate trees. It will match trees to sites based on compatible characteristics. Lists of trees generated by SelecTree should be viewed as a guide, not as the final authority in a tree search. SelecTree is maintained by the Urban Forest Ecosystems Institute at Cal Poly State University, San Luis Obispo.

- i-Tree Tree Benefit Calculator – i-Tree Design (www.ireetools.org)

  i-Tree Design (itreetools.org) is an application within i-Tree, intended to be a starting point for understanding trees' value in the community rather than a scientific accounting of precise values. i-Tree Design helps you to calculate the approximate benefits that individual trees may provide. This tool relies on average species growth and other geographic parameters that are generalized from city, county, state, and climate region data. The benefits trees can provide when selected and planted to conserve electricity use can be calculated using the methods detailed in the USDA Forest Service publication, "Carbon Dioxide Reduction Through Urban Forestry: Guidelines for Professional and Volunteer Tree Planters (PSW-GTR-171)." Trees' effects on buildings from shade, evapotranspiration, and wind speed reduction (windbreak) are calculated using an applied reduction factor based on tree type, height, azimuth, and distance from the home.

Table 6. City of Colton Tree Palette and Tree Selection Criteria

A. The goal is for City of Colton's urban trees to be:

1) Suitable for Colton's weather and the specific land use;
2) Reinforce existing trees and Colton's urban forest/ecosystem;
3) Create a diverse canopy (i.e., by species and age);
4) Exclude specific trees as not desirable (e.g., Palm Trees);
5) Encourage transition to the 'weather of the future' due to climate change.

B. The City tree palette is selected on the folllowing criteria:

1) Hardiness – as determined by suitability for Colton's soil and weather;
2) Mature height – user specified minimum and maximum heights;
3) Community & Environmental Benefits – ranked from 0 to 10:

	Rank
a) Carbon capture & storage	High
b) Air pollution removal	High
c) Building energy conservation	Medium
d) Property Value Increased	Medium
e) Air temperature reduction (i.e., Shade & cooling)	Medium
f) Stormwater Capture	Medium
g) Sound Reduction	Low
f) EcoSystem Health	Low

C. The following process and resources were relied on:

1) Colton's HUB City Center Specific Plan, "Plant Materials List";
2) I-Tree Species Selector (USDA Forest Services & Horticopia, Inc.);
3) Certified Arborist knowledge of Colton's soil & weather;
4) Street Trees Recommended for Southern California, Street Tree Seminar ;
5) Sunset Western Garden Book, zones and recommended trees;
6) City of Palm Desert Landscape Maintenance Guide's Trees;
7) Incredible Edible Community Garden (IECG) Tree List

Table 6. City of Colton Tree Palette and Tree Selection Criteria, *continued*

Tree Selection Criteria: 1. Colton's Weather: Sun, Rain & Water
2. Hardiness to Climate
3. Tree Height and Canopy Spread
4. Location (e.g., Park, Street, Home)
5. Insect & Pathogen Resistant
6. Community Beautification

	Broadleaf		Pine	Fruit	Native Trees
	Deciduous	Evergreen			
Large Trees	Ash Ginkgo Mulberry Planetree Sycamore	Oak Carob Grevillea Camphor Laurel	Afghan Pine Aleppo Pine Atlas Ceder Stone Pine		Coast Live Oak White Live Oak Interior Live Oak Cottonwood
Medium Trees	Ash Jacaranda Pistache Pear Locust Redbud	Acacia Box Willow Laurel Magnolia	Torrey Pine Canary Pine	Apple Avocado Apricot Fig Lemon Orange Peach Plum Pomergranate Loquat	Western Redbud Box Elder Pinyon Pine Dogwood
Small Trees	Willow Crape Myrtle Sumac	Bottlebrush Loquat Photinia Sumac			Palo Verde Pacific Willow Desert Willow

- National Tree Benefit Calculator (treebenefits.com/calculator)

  The Tree Benefit Calculator allows anyone to make a simple estimation of the benefits individual street-side trees provide. This tool is based on i-Tree's street tree assessment tool called 'Streets'. With inputs of location, species and tree size, users will get an understanding of the environmental and economic value trees provide on an annual basis.

  The Tree Benefit Calculator is intended to be simple and accessible. As such, this tool should be considered a starting point for understanding trees' value in the community, rather than a scientific accounting of precise values. For more detailed information on urban and community forest assessments, visit the i-Tree website.

Tree Planting Guide – Holistic and Adaptive Tree Management Best Practices

Colton's Integrated Tree Management Guide (Table 7) provides the tools to support a comprehensive planning approach that considers landscape design, implementation, and the application of tree best management practices. Colton's Tree Planting Guide (Attachment 5) and the adoption of the City of Colton Tree Palette (Table 6/Attachment 4) are augmented the Urban Tree Management Best Management Practices (BMPs), provided in Appendix 1 – 13 (American National Standards Institute (ANSI) for Tree Care Operations - Tree, Shrub, and Other Woody Plant Management Standard Practices (Planting and Transplanting) ANSI A 300 (Part 6)-2012 and its companion publication, ISA's Best Management Practices, Tree Planting (Second Edition). These ANSI BMP's focus on selecting the right tree (consult the City of Colton Tree Palette – Table 6 and Attachment 4), planting the tree in the right place, using good planting practice (use the Tree Planting Guide Attachment 5), and adopting Tree Management Best Practices. Trees appropriately selected, located and planted can decrease risks and increase the likelihood of delivering both near-term and long-term value to the community. In combination with the City of Colton Urban Forest Management Master Plan, these help to achieve City of Colton's urban forest management vision, goals and objectives. This guide should be used by the City of Colton departments, planners, landscape architects, urban foresters, business and residents in selecting, locating, planting, and caring for trees in Colton.

The following recommendations supplement the ANSI materials (see above). They are based on applied arboricultural knowledge for Colton's existing urban forest (based on the Colton Tree Inventory) and current and anticipated soil and weather conditions.

Planting Season

The best time of year to plant trees is in the fall and winter months (October – March). This period has milder temperature with more rainfall. Planting is less stressful because the trees are dormant, root growth increases, there's less susceptibility to disease. Working conditions are desirable and the community is more inclined to participate in community tree planting events.

Table 7: Colton's Tree Planting Guide

1. Tree Management Responsibilities
    a. Colton Sustainability Office Coordinates City-wide Performance Metrics
    b. Establish budget for planting new trees on public places (e.g., parks, parkways)
    c. Establish City-Wide 'Colton Tree Committee'

2. Colton Tree Management Policy and Standards
    a. Adopt Tree planting requirements into General Plan/ 'Development Projects'
    b. Update Colton's 'The Street Tree Ordinance'
    c. Use Certified Arborist for Consultation

3. Engage Colton Community
    a. Update Community Communication
    b. Encourage private tree planting with rebates

4. Strengthen Colton's Tree Maintenance Program
    a. Create Tree Maintenance Program based on priority needs
    b. Establish 'Tree Health Assessment/Risk Management' Program
        i. Inspections by qualified arborist (with reporting requirements)
        ii. Tree Removal Program

    c. Use Urban Forest Tree Maintenance Best Management Practices
    Appendix 1: Tree Inventories
    Appendix 2: Tree Risk Assessments
    Appendix 3: Managing Trees During Construction
    Appendix 4: Soil Management
    Appendix 5: Compost Quality Standards
    Appendix 6: Planting and Transplanting
    Appendix 7: American Standards for Nursery Stock
    Appendix 8: Tree Planting Details and Solar Access
    Appendix 9: Pruning
    Appendix 10: Supplemental Support System
    Appendix 11: Root Management
    Appendix 12: Integrated Pest Management

5. Colton Employee Safety, Contractor Safety and Public Safety
    a. Refer to Appendix 13 – Arboricultural Operations – Safety Requirements
    b. Recommended Minimum Qualifications for Outsourced Services
        i. ISA Certified Arborist
        ii. ISA Certified Tree Trimmer

Selecting Nursery Stock

Healthy trees should be carefully selected from the nursery, based on a 'model' contract (Table 8: Colton's Model Tree Selection Agreement). Be cautious, since approximately thirty-five percent of nursery tree stock is defective. Trees should be selected by a certified arborist with experience of selecting trees and knowledge of best practices (e.g., Appendix 7: ANSI z60.1-2014 American Standard for Nursery Stock). The same arborist that selected the trees in the nursery, should receive and verify their healthy condition when they arrive on the project, ready to plant.

For most habitat restoration projects, one and five-gallon trees are the recommended sizes. For street trees, parkways, and medians, 15-gallon (i.e., 24" box) sizes are standard. For single and multi-family residential, commercial, retail, parks and public buildings, 15 gallons – 48-inch box size trees are the norm.

Inspect the trees systematically from the ground up; start with the roots, trunk and then canopy:

- Roots: Examine the root collar for girdling roots, decay, and damage. If any defects are found the tree should be rejected.

- Trunk: Just above the root collar, the trunk should have a flare that tapers into a single dominant leader. The limbs should be uniformly spaced along the length and around the trunk. The limbs should be attached to the trunk at approximately a 45-degree angle with developing branch bark ridge and branch collar. Trees with co-dominate trunks or a single trunk that merges into two equal size trunks, should be rejected. Trees with limbs that are attached to the trunk with tight angles (approximately less than 10 degrees) between the limb and trunk, most likely have embedded wood and should be rejected.

- Canopy: Leaf growth should be vigorous, green, no chlorosis, or diseased. If the tree is deciduous look for leaf buds.

Tree Selection Based on Land Use

Land use will generally dictate tree species to be selected (Colton's Tree Palette includes information based on land use). The site's function, environmental conditions, and level of use will limit the selection to the trees best suited for the project. Managing tree life-cycle performance and maintenance requirements are critical to project viability.

- City Public Buildings:

  Civic buildings tend to be open, accessible, provide a "sense of place" and serve as landmarks. Trees selected for public buildings should be stately, medium to large conical or round, deciduous or evergreen. They should be slow growing and cultured to ensure longevity. Many of the trees may be dedications and "heritage

trees". If space is available, street and parkway trees surrounding the buildings should be medium to large specimens. Trees in the parking lots should be small to medium size evergreen and deciduous trees.

- Parks:

  Parks are defined as regional, community, neighborhoods, and pockets. They range in size between 20 acres and larger for regional parks and at several hundred to a thousand square feet for pocket parks. In terms of land use, parks have the greatest diversity in activity: sports fields, individual and organized recreational activity, passive use open space, and natural environments. Park trees are used to define, separate, transition, and enhance park space and activities. What is common for most parks are the opportunities for diverse citizen participation, City sponsored activities, and space available for trees of all types. Most of the trees on Colton's palette can be used in parks.

- Major Streets:

  Street trees help define the public and private realms, separates pedestrian from vehicular, and provide a "sense of place". Street trees can provide orientation, wayfinding and much needed shade for retail shoppers. Major streets may have two or more tiers of trees. There could be tall vertical trees in the medians, medium size canopy trees in the parkway and specimens used to articulate entries, gateways and intersections. There are considerable challenges (i.e., signs, traffic, utilities, etc.) with tree selecting and placement. However, with due-diligence, well selected and located trees can make a street extraordinary, pedestrian friendly and support retail business.

- Street Medians:

  Street medians vary in width and length. Some have paving enhancement, monuments, traffic calming features, and reduced utility conflicts. Trees selected for medians, should complement parkway street trees. Medians potentially provide more room for tree growth and diversity. Recommended trees for medians are medium to large sizes, deciduous, low maintenance, and grow naturally into conical shapes.

- Retail & Commercial Centers:

  Owners of retail and commercial centers view trees as generally an asset; however, if there're not well selected, located, and cared for – trees can be a liability. Retail centers rely heavily on visual access to signage. Many of the retail centers with large parking lots fronting streets would be better served using small to medium size trees that are mostly deciduous.

Table 8. Model Agreement and Scope of Work for Large Tree Planting Projects[1]

Scope of Work:

1. Source materials, obtain samples, cut sheets and photographs of representative trees and submit to <Certified Arborist> for review and approval.

All trees shall be selected using the following specifications:

- All trees are fifteen-gallon size;
- Have a strong single leading trunk with no co-dominants;
- Have limbs equally distributed along and around the trunk;
- Have vigorous leaf growth. If deciduous, have healthy lateral and terminal buds along stems;
- Have a firm root ball but not root bound with no girdling roots;
- No diseases (certified not to have disease vectors, pathogens, fungus, bacteria and viruses);
- The nursery stake shall not be embedded into the root crown and be easily extracted upon planting.

Tree Sizes (examples)

Tree	trunk caliper at 24" above ground	tree height	canopy width
Tree 1	¾"	5'	2'
Tree 2	¾"	6'	2'

2. Based upon <Certified Arborist> written approval, <Nursery> shall purchase materials, have it delivered to your nursery and separated into project allotments (see materials list).

3. <Certified Arborist> shall inspect all project trees and materials held at the nursery. <Certified Arborist> shall inspect the trees and materials for project suitability based upon the specifications provided herein. <Certified Arborist> reserves the right to refuse any material designated for use of the project that does not meet project specifications.

4. Upon <Certified Arborist> inspection and approval of trees and materials, <Nursery> shall deliver the materials to a secure location at <City Location>. The <City Location> is located at xyz Street. <Certified Arborist> or our representatives shall receive the materials, check the bill of lading, the quality and quantity of materials, and ensure it's unloaded into separate park allotments (see materials list).

5. Product Warrantees: <Nursery) shall provide a written product warrantee that all trees and materials are free of defects. In addition, all trees shall come with a one-year warrantee of survival upon date of purchase and contingent upon the trees being installed per plans, details and maintenance specifications as provided;

Payment: Upon completion of step 1 (see above) and <Certified Arborist> approval of submittals, <Client> shall pay <Nursery> 50% of the agreed upon contract. Upon the completion of step 4 and <Certified Arborist> approval of the deliverables, <Client> shall pay <Nursery> the final 50% payment as agreed per contract.

[1] This template should be modified to meet the specific project needs.

For commercial centers, addresses and the center's name are typically placed on monuments near the street at highly visible vehicular entries. Compared to retail centers, commercial centers provide more opportunity to use a variety trees. In commercial centers with large courtyards or common areas, large trees can be used.

Where retail and commercial businesses front the street, trees function as part of the streetscape. They slow vehicular traffic, provide shade to business, opportunities for outdoor dining and socializing. The best trees for these locations are small to medium size trees, deciduous and pyramidal in form.

- Single and Multi-Family Residential Areas:

  To encourage citizens to walk and participate in nature, trees recommended for neighborhoods should be rich in character and diversity. There should be variety of: seasonal leaf colors and shapes; interesting bark colors and textures; tree structures (i.e., round, conical, pyramidal, weeping, oval, columnar, open, irregular, etc.) providing visual interest and shade patterns; interesting flowers, fruits and seeds. Tree diversity will attract birds and wildlife that people enjoy observing daily.

- Residential Streets (Public Parkway Space):

  Tree selection for residential neighborhood medians parkways and street trees, should complement the architectural character of the neighborhood and help define the space between the street and the homes. Trees selected from the palette should be equally mixed evergreens and deciduous, small to medium in size with large trees used where neighborhoods transitions into parks or public buildings. We recommend that trees in street medians should be owned and managed by the City. Trees in parkways and in sidewalk tree wells should be owned and managed by the City; however, where City water resources are not available, homeowners can provide irrigation.

Water Your Trees …. and Your Community

Business and residents are encouraged to water trees that line their streets. Healthy, livable communities include 'Complete Streets' with bike paths (Colton Avenue is a good local example), transit, encourage walking (and provide for multi-mode transit). As part of community planning, consider combining trees with public transit planning (provide shade at bus stops) and adding community water fountains to encourage walking (see https://smartgrowthamerica.org/program/national-complete-streets-coalition/ for information on 'Complete Streets' and WeTap.org for information on community water fountains.

Engage the Colton Community

The Community Outreach & Education Plan helps to explain the overall approach, motivates buy-in to support City urban forest activities, and to better understand the benefits of a healthy, resilient urban forest. In combination, this will inspire residents and business to select, plant and care for trees on their property. The 'City of Colton Urban Forestry Management Master Plan' is stronger and becomes viable with the engagement of the entire Colton Community (see Attachment 7). The Colton residential and business community can utilize the 'Colton Community Tree Palette' and 'Public Space Planting Guide' to select, care for and maintain trees on their property.

Explain Colton's Approach

Colton's Tree Management Master Plan includes 'community engagement and education' and is complete when we have listened and incorporated the input into the Master Plan. This both strengthens the selection and planting of trees and helps to ensure a sustained and resilient forest. Colton's Urban Forest Management Master Plan is:

1. Take Care of Colton's Existing Trees;
2. Select, Plant and Care for Additional Trees;
3. Engage the Colton Community;
4. Align with Colton's Priorities and Optimize Resources;

Community engagement starts with creating a narrative about the value of Colton's trees so that residents and business recognize the value. Colton's Tree Management Master Plan can be shared using a combination of storytelling, updates to existing social media platforms, and engagement with civic and community groups, schools and government organizations. Key opportunities are available with the City of Colton's Community Services Department Web Site, 'Colton Connections' and social media. This community engagement should be an on-going, ever-green process that uses:

- City of Colton Web Page
- Community Service Department
  - Facebook
  - Colton Connections

Because communication is a two-way 'give & take', our approach to engagement includes creating dialogue and gaining community input using public surveys.

Attitudes About City Trees
Knowledge of Tree Care
Support for City Trees

Inspire Residents and Business

A key element of Colton's Master Plan is to encourage residents and business to select, plant and grow trees to support the wider urban forest. While these private trees are not within the scope of this plan, implementation of Colton's Urban Forest Management Master Plan does help to motivate private involvement (e.g., Community outreach and Colton Electric tree purchase rebate programs).

An urban forest is part of the larger community. The support of the Colton community depends on the connection they feel towards their trees, and the recognition of the value these trees bring to the community. The engagement of the Colton community is essential for the Colton Urban Forest Management Master Plan to be successful. This requires participation of the full range of stakeholders in implementation of the Master Plan, helping to allocate resources (and to commit their own resources to care of trees at home and business), and track progress.

There are opportunities for the following groups to increase their support of this Master Plan:

1. Colton Residential Community

2. Colton Business Community
    a. Chamber of Commerce
    b. Business Civic Clubs

3. Colton City Schools
    a) Encourage inclusion of relevant course materials in K-12 curriculum;
        i. Support Colton High School 'Student Environment Club'

4. Community Organization – Friends of Colton's Trees (e.g., a public/private work group)

'Tree planting' events create the opportunity to engage, educate and invigorate the community for trees in their neighborhood. The focus is on creating examples of the 'right tree for the right place' and demonstrate long-term care and maintenance to ensure survival. This will be both a call to action and a celebration of Colton's commitment to a healthy, resilient & livable city.

Encourage New Tree Planting

Colton's community focused approach is to encourage new tree planting. The active participation by residents and the business community helps Colton to achieve the vision for Colton's urban forest … 'a sustainable and resilient mix of healthy trees throughout our public parks, avenues, parkways, arroyos, rivers and open spaces. Colton's trees provide residents and the business community with beauty, shade, comfort, health and economic benefits'.

When given the opportunity, Colton's residents and business community will help to ensure that Colton's trees are cared for, valued, and protected by the City and its citizens as a treasured community asset.

Community engagement also provides the opportunity to explain that Colton's trees also provide additional tangible benefits. Colton's trees and the urban forest helps to ensure public health, business vitality, environmental quality, water conservation, social equity, improved livability, and enhance public safety. Colton's urban forest also includes privately owned trees and vegetation on residential and business property.

In addition to communication, Colton will establish should continue the Tree Adoption Program. This provides matching funds to support the planting of new trees throughout the community. This should focus on:

- Residential Parkways
- Business Parkways
- Residential Energy Efficiency
- Business Energy Efficiency

In combination, City of Colton's Urban Tree Master Plan and deep public and business engagement helps to sustain a healthy and resilient urban forest. These public, private, and natural trees will:

1. Thrive: Trees are carefully planted and cared for;
2. Protect: Trees are protected by holistic best management practices;
3. Nurture: Our community is devoted to the trees in the urban forest;
4. Connect: Trees connect our community, streets, shopping, parks, and open spaces;
5. Be Resilient: Trees are rooted in the larger ecosystem;
6. Be Diverse: Our forest is comprised of multiple species and different age groups;
7. Be Valued: Colton's trees are recognized as essential to our community well-being;

Align with Colton's Priorities and Optimize Resources

Colton's Tree Management Master Plan is aligned and supports a wide range of civic priorities. This alignment also provides a path forward to optimize resources and focus on community priorities.

City wide planning provides the framework to evaluate options, gain input from the community, understand resource requirements, and prioritize projects to move forward in a systematic fashion. The guiding principles for City of Colton's Urban Forest Management Master Plan are to:

1. Align with Colton's General Plan and Ordinances
2. Support Colton's governance (e.g., Planning Commission);
3. Augment Colton's 'Cleaner Greener Community' initiatives;
4. Driven by engagement and dialogue with citizens and business;
5. Deliver value across the community over the near-term and long-term;
6. Focus on creating healthy trees and resilient ecosystems;
7. Supports public health and safety;
8. Results in co-benefits in electricity, water, wastewater, and storm-water efficiency;
9. Incorporates tree- and urban forest-Best Management Practices.

Include with Colton's Sustainability Initiative

Colton has an existing sustainability program. Based on established priorities, this has focused on energy and water conservation, and using rebates to encourage residents to plant trees to reduce electricity demand (e.g., TreeBate). This program has been effective and delivers real value to the Colton community. However, this program should be strengthened to increase the scope and commitment from the larger Colton community. This will achieve stronger triple-bottom line value from environmental, economic, and social benefits. While this Urban Forest Management Master Plan is focused on growing a healthy forest, it should be viewed as integral to the full set of sustainable 'green-infrastructure' programs, including electricity-, water-, waste water-, and transportation (e.g., public transit, bike ways, and creating 'walkable' neighborhoods).

In addition to direct benefits from Colton's trees, there are opportunities to obtain regulatory benefits. For example, U.S. EPA supports tree planting as a voluntary measure to reduce ground-level ozone formation, which results from using shade and evaporative cooling to reduce the urban heat-island effect. Maintaining healthy trees is included as Storm water best management practices since they increase infiltration by capturing run-off.

Citizen Support & Community Integration: City-wide Planning and Programs

Colton's General Plan has placed value on the placement of green infrastructure spaces as part of its requirements for development. To implement the goals in the General Plan, there are numerous Ordinances that are managed across City departments. These need to be updated to

reflect the implementation of the 'Forest Master Plan'. In addition, various City and community Commission's and Committees need to include these materials to augment their planning.

1. Planning Commission
    a. Historic Preservation Commission
    b. Design Review Committee

2. Recreation and Parks Commission

3. Utilities Commission

Colton's Policy and Standards reflect the values and priorities of the residents. These should be updated to reflect the Urban Forest Management Master Plan (see Attachment 8). These include:

Policies and Standards

a. City of Colton Ordinance(s)
    i. Tree Ordinance (976)
    ii. Street Trees and Shrubs (1221)

b. City of Colton Codes
    i. Title 6: Health & Safety
    ii. Title 8: Property Maintenance and Enforcement Procedures
    iii. Title 12: Streets and Other Public Places
    iv. Title 13: Utilities
    v. Title 14: Storm Drains and Floodplain
    vi. Title 16: Division of Land

In addition, Colton should review the 'Climate Action Plan' and the San Bernardino Valley Regional Utility Water Management Plan and update those elements the encourage a healthy urban forest.

There are also opportunities to gain co-benefits from using tree management to meet existing community goals and standards or codes from State or Federal regulatory agencies. These include:

1. Landscaping criteria
2. Storm water Management
3. Forest Conservation and Preservation
4. Conservation of Natural Areas
5. Open Space Design for Development
6. Erosion and Sediment Control

An 'excel' tree planning worksheet' has been prepared to help plan projects and, set budgets, and to track progress to meet Colton's goals (see Model 1 and Attachment 9). This can be used to focus on specific targeted land use areas.

Model 1: Tree Planning Worksheet

City of Colton Urban Forest Management Master Plan

This 'Tree Planning Worksheet' can be used by the City of Colton to develop and implement tree planting projects to meet Colton's Urban Forest goals. Total program costs include: 1) Management and Adminstration; 2) Maintenance (including both annual costs and emergency tree maintenance); and 3) Tree Planting.

> This Worksheet is focused on establishing budgets for Colton Tree Planting Projects. A 'User Guide' is on Page 2.
> The Blue 'cells' need to be filled in by the User. The results will be auto-filled based on these inputs.

Tree Planning Worksheet - Trees Planted Per Colton Planning Cycle

Tree Planting Targets (Projected)		Years In Plan	Percent Increase	Desired Number of Trees	Number of Trees Planted	Project Budget Required	Project Budget Per Year
Number of Existng Trees (Baseline)	5,000	5	50%	7,500	3,325	$397,753	$79,551

Planting Area Allocation

	Business Street		Residential Street						
	Median	Parkway	Median	Parkway	Parks	City Buildings	Natural Spaces	Contingency Reserve	Total Trees Per Cycle
Trees (per Cycle)	133	166	67	166	33	33	67		665
Allocation	20%	25%	10%	25%	5%	5%	10%		100%
Budget	$17,689	$21,280	$8,845	$11,305	$3,259	$3,425	$6,517	$7,232	$79,551
Per Tree Costs	$133	$128	$133	$68	$98	$103	$98		
Tree Costs Breakdown									
Site Prep & Water	$25	$20	$25	$0	$5	$5	$5		
Tree Purchase	$40	$40	$40	$50	$40	$40	$40		
Deliver & Plant	$40	$40	$40	$0	$25	$25	$25		
Stakes, Ties & Food	$13	$13	$13	$13	$13	$13	$13		
Maintenance (90 Days)	$10	$10	$10	$0	$10	$10	$10		
City Maintain (1 Year)	$5	$5	$5	$5	$5	$10	$5		

Inputs: Tree Planning Worksheet

		Input in Blue Cells	Notes For User Input
Input:	Colton's Public Tree Baseline Sample (From Inventory):	E16	Assumed Colton Tree count
Input:	Planning Horizon (in Years):	F16	Duration of project
Input:	Desired Increase In Public Trees (in Percent):	G16	Expected result from the completion project
Input:	Allocation by Planning Area (in Percent):	C27 - I27	Where the trees will be planted
Input:	Cost for Site Prep & Water (in Dollars):	C25 - I25	Based on project location
Input:	Cost per Tree (in Dollars):	C28 - I28	Based on Nursery costs (per Tree)
Input:	Cost to Deliver and Plant Tree (in Dollars):	C29 - I29	Based on project costs
Input:	Cost to Stake & Feed Tree (in Dollars):	C30 - I30	From Colton's experience/Arboist judgement
Input:	Cost for 1st Year Tree Maintenance (in Dollars):	C31 - I31	From Colton's experience/Arboist judgement
Input:	% Newly Planted Trees Dying Within Planning Cycle:	10%	From Colton's experience/Arboist judgement
Input:	% Mature Trees Dying Within Planning Cycle:	1%	From Colton's experience/Arboist judgement
Input:	Total Tree Loss Per Year:	73	Derived from User Inputs (I16, F16, G53 & G54)
Input:	Budget Contingency:	10%	Estimate of cost overruns based on PM experience

Adopt Performance Goals and Establish Metrics

The development of the 'Urban Forest Management Master Plan' includes obtaining input from a wide range of stakeholders. Colton does not have sufficient tree canopy (at about 7%), and this should be increased to increase the clean air to protect public health, to help conserve electricity, to capture storm water, and to create shade to encourage retain shopping. The 'Master Plan' provides a clear path forward:

1. Take Good Care of Colton's existing trees;
2. Select, Plant and Care for additional trees;
3. Engage the Colton Community;
4. Align with Colton's priorities and resources.

Performance Metrics

Colton's Urban Forest Management Master Plan will be implemented over a 1 – 25-year time span. The adoption of targets, objectives, and performance indicators is helpful to ensure successful implementation and to identify ways that the Master Plan can be improved.

While the Colton Urban Forest Management Master Plan provides the framework and roadmap, adopting performance goals, establishing metrics, and setting targets helps with implementation, guides resource allocation, shows where progress is being made, gives direction to your next steps, and helps share your story with the entire Colton community. This 'sense of urgency' is a necessary component to the effective implementation of the 'Master Plan'.

Colton's Urban Forest Management Master Plan helps to achieve Colton's Vision and implement the Mission to deliver real near-term and long-term value for the entire community – residential and business. The 'performance goals' help track progress and achieve desired outcomes (Table 9):

Goal 1: Implement the Colton Urban Forest Management Master Plan

Goal 2: Strengthen the health and increase the number of Colton's Community Trees

Goal 3: Strengthen the health and increase the number of Colton's Non-public Trees

Goal 4: City-wide Master Plan Integration

Therefore, performance targets are adopted in a phased approach, from the initial adoption of the Plan, to within 3 years, and at 5 years. The specific targets should be updated on an annual basis. In addition to gaining community value from the trees themselves, a healthy urban forest helps to address other cumulative impacts (e.g., from drought, reduced tree planting, and deferred tree maintenance).

Table 9. Colton Urban Forest Recommended Goals and Metrics (Targets TBD)[1]

Goal 1: Implement the Colton Urban Forest Management Master Plan

- Metric 1: Designate Colton Electric Sustainability for responsibility and accountability;
  - 1a: Adopt Colton's Urban Forest 'Vision'
- Metric 2: Allocate adequate budget;
  - 2a: Colton Electric (i.e., Tree Rebates) and Parks and Recreation (i.e., Tree Maintenance)
  - 2b: Regional Funding Partners
- Metric 3: Adopt Master Plan Elements:
  - 3a: Colton Community Tree Palette
  - 3b: Tree Planting Guide
  - 3c: Colton Tree Adaptive Management Program
- Metric 4: Community Engagement
  - 4a: Update City of Colton Web Site
  - 4b: Update Community Connections Facebook
  - 4c: Citizen involvement and neighborhood involvement (Survey)

Goal 2: Strengthen the health and increase the number of Colton's Community Trees

- Metric 5: Increase tree canopy by growing more trees (By Land Use Area)
- Metric 6: Increase the canopy age diversity
- Metric 7: Increase the canopy species diversity
- Metric 8: Support 'Complete Streets', Transit & Local Retail Business

Goal 3: Strengthen the health and increase the number of Colton's Non-public Trees

- Metric 9: Increase tree canopy by growing more trees (Residential & Business)
- Metric 10: Increase the canopy age diversity
- Metric 11: Increase the canopy species diversity

Goal 4: City-wide Master Plan Integration

- Metric 12: Colton Departmental Coordination (within Colton City)
  - 12a: Utilities (Electric & Water)
  - 12b: Storm water/Wastewater
  - 12c: Recreation & Parks – Community Services
- Metric 13: Participation of Colton Commissions
- Metric 14: Regional Cooperation (Regional/SAWPA/California)
- Metric 15: Urban wood and green waste management Program

[1] (Adapted From: The Sustainable Urban Forest – A Step-by-Step Approach, 2016. M. Leff)

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