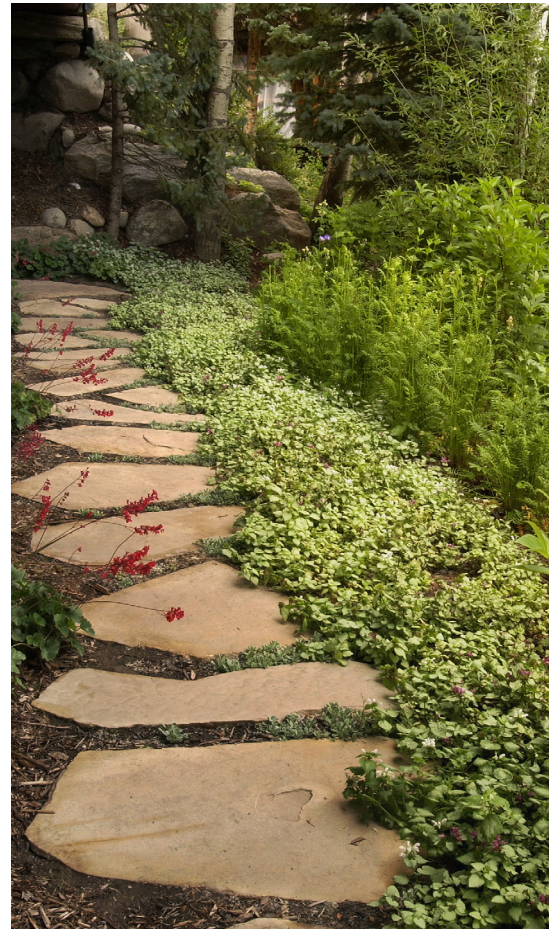


MAKING THE MOST OF EVERY DROP

Water-Efficient Landscapes for Mammoth Lakes, CA

Recommendations and Requirements

USER GUIDE May, 2014



INTRODUCTION	4
Landscape Challenges in the High Sierra	4
EFFICIENT WATER USE	5
Plant Selection and Design Principles	5
Irrigation Principles	7
WATER EFFICIENT LANDSCAPE DESIGN OPTIONS	8
Complying with the Ordinance	8
SUBMITTAL REQUIREMENTS	9
Overview and Descriptions	9
Site Plan	11
Slope Plan	12
Landscape Area Plan	13
Project Plant Schedule	14
Basic Irrigation Plan	15
Maintenance Schedule	16
Water Budget Worksheet	17
MAMMOTH LAKES PLANT LIST	18
Mammoth Lakes Recommended Plant List	18
Mammoth Lakes Not Recommended Plant List	20
ADDITIONAL RESOURCES	21
Town of Mammoth Lakes Design Guidelines	21
General Guidelines for Creating Defensible Space	21
Ordinance 2010-01- Mammoth Lakes Fire Protection District	21
TRPA BMP Handbook	21
Home Landscaping Guide for Lake Tahoe and Vicinity	21

LANDSCAPE CHALLENGES IN THE HIGH SIERRA

The growing season is short in Mammoth Lakes. The climate is sunny with average precipitation (33 inches average annual rainfall and 211 inches average annual snowfall), but the high elevation (7,880 ft.) often means late spring and early fall freezing temperatures. Summer days are warm but nights can be cold.

Wildflowers and native plants thrive, but compatible, even drought-tolerant, ornamental plants require irrigation. Local soils are fast-draining and there is minimal rain in the summer season, so water conservation is extremely important in Mammoth Lakes.

Landscaping irrigation currently uses more of Mammoth Lakes' water supply than any other use. If the water supply were to be depleted, the environmental and economic cost to replenish it would be extremely high. In the face of increasing demand and limited supply, the State of California has adopted water-efficient landscaping requirements. The Town of Mammoth Lakes has also adopted a Water Efficient Landscape Ordinance (WELO) that achieves the State's regulatory requirements (Town Municipal Code Chapter 17.40).

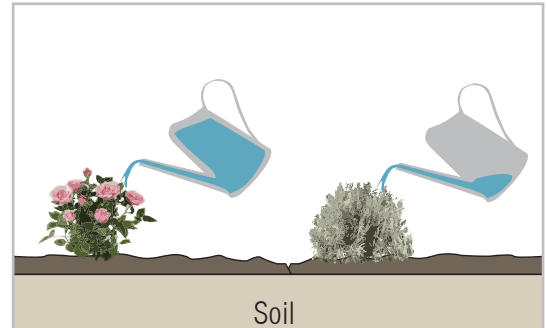
Landscape design that is fire-safe, compatible aesthetically with the natural setting, and makes the most of every drop of water is the goal of the WELO. This User's Guide is written for homeowners, property managers, and contractors to help guide them through the WELO requirements.



Attractive, low maintenance, and water-efficient landscapes are easy to achieve, even at high altitude. These recommendations and requirements will be helpful as you plan your landscaping project.

NATIVE PLANTS AND COMPATIBLE NON-NATIVES

Selecting native or regionally appropriate plants from the Mammoth Lakes Recommended Plant List (see page 18) will reduce your landscape's water need by at least 50% and simplify landscape maintenance. Plants native to the high-elevation Eastern Sierra are adapted to a rigorous climate. Native plants require less water and can handle dry soil conditions better than non-natives; however, many attractive non-native plants blend well in alpine settings and can thrive in Mammoth Lakes without becoming invasive.



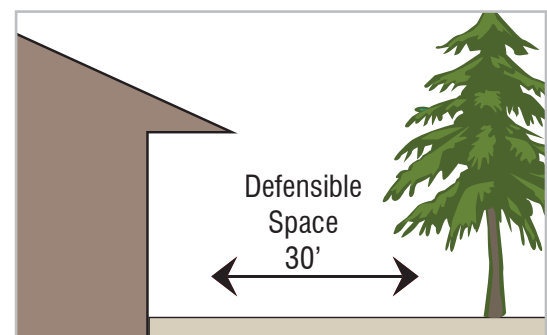
INVASIVE SPECIES

Avoid plant species identified as “invasive” in Mammoth Lakes (see page 20). Invasive plants are non-native species that can thrive in areas beyond their natural range of dispersal and can cause damage to native species. Invasive plants are vigorous- these plants are adaptable, aggressive, and reproduce abundantly. Invasive species can also use a lot of water.



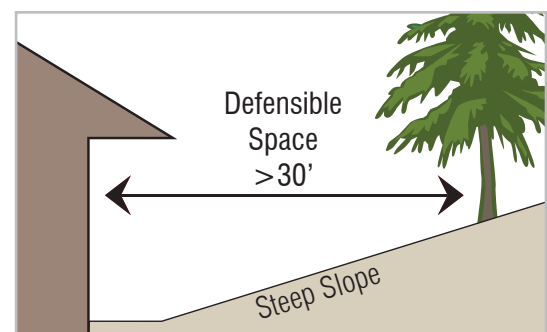
DEFENSIBLE SPACE AND FIRE HAZARDOUS PLANTS

Planting a fire-safe landscape in Mammoth Lakes is critical. Mammoth Lakes Fire Protection District recommends creating a zone of “defensible space” that is largely free of vegetation and extends at least 30 feet out from homes and other buildings. Defensible space should be greater than 30 feet if your property is on a steep slope.



AVOID FLAMMABLE PLANTS AND “FIRE LADDERS”

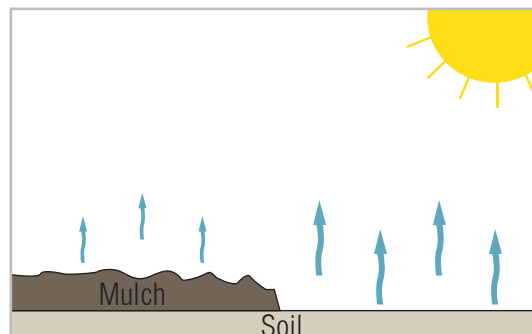
Plants that accumulate dead branches, needles or leaves, and have high resin or sap content are fire hazards. Junipers and certain other evergreens plants should be avoided. **To avoid creating “fire ladders,” remove lower limbs on tall pines and other trees and thin out small trees and shrubs near existing large ones. Rake up needles, leaves, and other flammables within the defensible space.**



EFFICIENT WATER USE: Plant Selection and Design

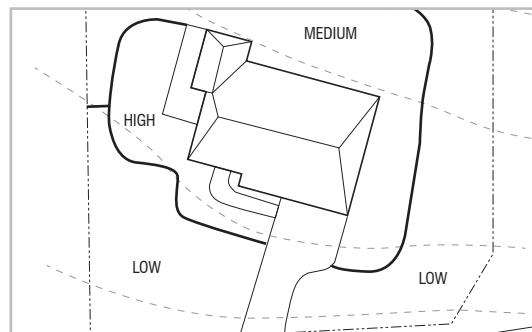
AVOID BARE SOIL

Slow the rate of evaporation and reduce water use by mulching plant root zones. Mulching also keeps weeds down.



GROUP PLANTS WITH SIMILAR WATER NEEDS

Arranging plants by “Hydrozones” (Hz) and then designing your irrigation system to deliver the appropriate amount of water for each Hydrozone allows for more efficient water use.



PLANTS THAT USE LITTLE WATER

Minimize or eliminate the use of annuals, which don’t have established root systems and require more water. Many perennials, shrubs, and trees in the Mammoth Lakes Recommended Plant List use little water.



MINIMIZE OR ELIMINATE TURF

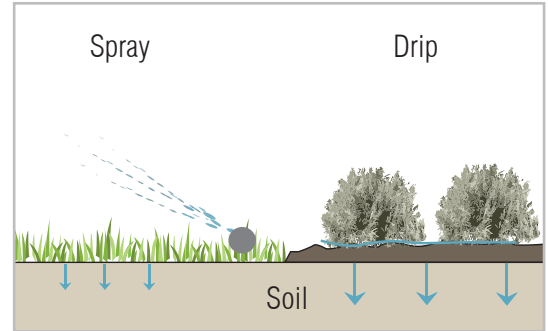
Turf or lawn requires a substantial amount of water to thrive in Mammoth’s dry climate. The use of turf should be eliminated or minimized. The Mammoth Lakes Recommended Plant List recommends a number of native and hybrid grasses that serve as good replacements for turf.



EFFICIENT WATER USE: Watering Where and When it's Needed

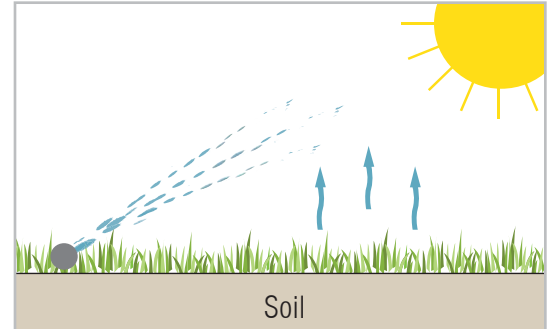
WATERING METHODS

Spray irrigation systems with fixed or moving sprinkler devices distribute water quickly over large areas. Commonly used, spray irrigation can waste large quantities of water and is inefficient at getting water down to plant roots where it is needed. Drip emitter systems and soaker hoses deliver water slowly and deeply, thoroughly wetting root zones, with far less evaporation.



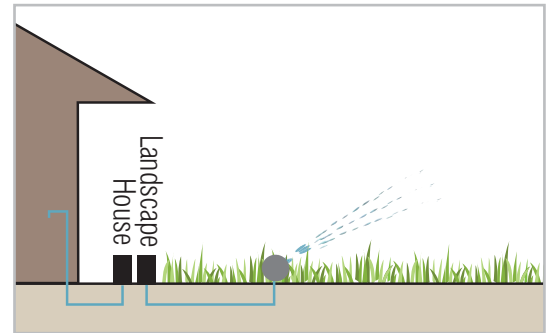
WHEN TO WATER

When spray irrigation is applied in the middle of the day or when it is windy, water can evaporate almost as fast it is being applied. **Irrigate with spray heads when temperatures are cool and humidity is highest- between 5:00pm and 10:00am** if it is not windy. Drip irrigation and soaker hoses irrigate effectively anytime.



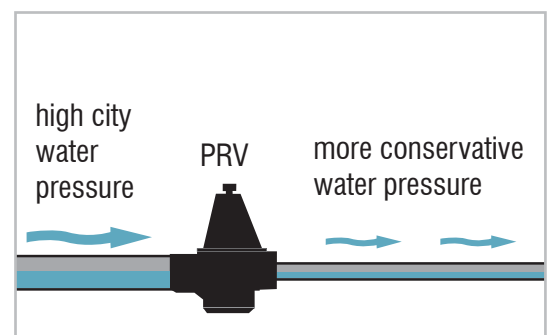
USE SEPARATE WATER METERS FOR LARGE PROJECTS

Large projects with extensive landscaping should have separate water meter for outdoor water usage be installed to monitor the efficiency of the irrigation system. Also, a separate meter allows the shut-off from the main in the event of a failure in the irrigation system.



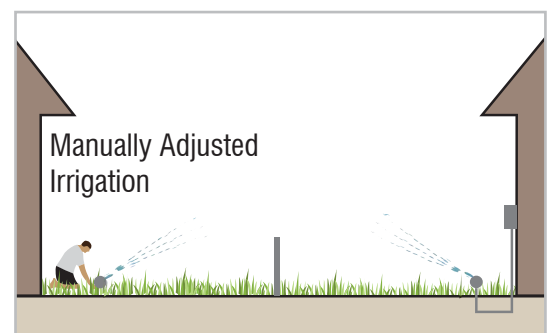
PRESSURE REGULATING VALVES SAVE WATER

Pressure Regulating Valves (PRVs) prevent water waste. Water pressure in Mammoth varies depending on location, time of year, and weather conditions. PRVs regulate the water pressure in an irrigation system by maintaining it at a certain level. PRVs are also used to ensure even irrigation on sloped sites.



SMART IRRIGATION VS. MANUAL CONTROLLERS

A properly installed and maintained Smart Controller will reduce water use. Smart Controllers automatically update the watering schedules to allow for weather and time of year. Manual irrigation controllers require the user to adjust the run times manually, and are less efficient because adjustment is typically infrequent.



WATER EFFICIENT LANDSCAPE DESIGN OPTIONS: Complying with the Ordinance

The Town of Mammoth Lakes encourages all landscaping projects, large and small, to be designed with water-efficiency in mind. New and rehabilitated (re-landscaping) projects that are over 2,500 square feet must be approved by the Town of Mammoth Lakes prior to landscape installation in order to show compliance with the Water Efficient Landscape Ordinance. The Town provides three submittal options. Landscape projects with the lowest water-use have a simpler application process than higher water-use projects, which require more complex documentation.

Option A: Low Water Use / Native Plant Emphasis / No Turf or Lawn

Option A is the simplest application process; however, Option A can only be used if the landscape project meets the following criteria:

- No turf or lawn.
- No invasive plants or high fire-hazard plants.
- More than half of the landscape area consists of low water-use plants (refer to Mammoth Lakes Recommended Plant List); remaining area is medium water-use.
- Low-volume drip or soaker irrigation.

Option B: Medium Water Use / Limited Lawn

Option B requires slightly more compliance documentation than Option A, but must be used if limited lawn or turf is proposed. Option B can only be used if the landscape project meets the following criteria:

- Estimated Total Water Use (ETWU) is 85% or less of the Maximum Allowed Water Use (MAWA), as calculated in the ordinance (requires Water Budget Calculations- see page 17).
- Turf or lawn area is less than 20% of the total landscape area or less than 1,250 square feet, whichever is lesser.
- No turf or lawn on slopes greater than 25%.
- No invasive plants or high fire-hazard plants.

Option C: High Water Use / Large Projects

Option C is to be used by larger and more complicated projects with high water-use. Option C requires the most documentation and will likely require a landscape professional to assist with documentation. Option C must be used if the landscape project meets the following criteria:

- Estimated Total Water Use (ETWU) is less than or equal to Maximum Allowed Water Use (MAWA), as calculated in the ordinance (requires Water Budget Calculations).
- Turf or lawn area is more than 20% of the total landscape area or more than 1,250 square feet.
- Water features are used, such as fountains, swimming pools or spas, artificial ponds or waterfalls/streams.

Figure 1 shows the submittal requirements for each of the three Options, which are described in more detail in the next section.

Figure 1

		REQUIRED DOCUMENTATION												
OPTION		Slope Plan	Landscape Area Plan	Project Plant Schedule	Basic Irrigation Plan	Maintenance Schedule	Water Budget Worksheet	Detailed Planting Plan	Soil Management Report	Detailed Irrigation Plan	Grading and Drainage Plan	Certification of Substantial Completion	Irrigation Survey and Report	Comprehensive Survey and Report
	A		X	X	X	X						X	X	
	B	X	X	X	X	X	X					X	X	
	C			X			X	X	X	X	X	X		X

SITE PLAN

A site plan can consist of a simple hand-drawn plan, a plan prepared by an architect, landscape architect or contractor or an official site survey (required for Option C). All site plans should contain the following:

- The location of existing buildings and structures to remain.
- The location of existing site features, such as trees and rock outcrops, that will be retained.
- The location of proposed non-plant related site features (structures, driveways, parking, walkways, patios, decks, etc.)
- Topography (slope) of the site (if available) (Required for Options B and C). Turf or lawn is not allowed on slopes of 25% or more. Figure 2 shows how you can calculate the slope of a site.

SLOPE PLAN

A slope plan is only required for Option B if turf will be installed. Using the topography on your site plan and the slope calculation diagram on this page you can determine the percent slopes across the site. In this example the area with a 25% slope is identified and should not have turf. Native grasses, shrubs, and trees can all be appropriate choices when deciding how to plant a steep slope as they have deeper roots which help to prevent erosion and waste of water.

LANDSCAPE AREA PLAN

The Landscape Area Plan is a drawing that identifies the areas of a landscaping project site that contain plants with similar water needs (low, medium, high). These areas are referred to as Hydrozones (Hz). Your irrigation system should be designed to match the water needs of each hydrozone so that the appropriate amount of water is delivered and water is not wasted. You should try not to mix plants with different water needs in each hydrozone, keeping low water-use plants together, medium water-use plants together, etc. Figure 4 shows what a basic Landscape Area Plan should look like.

Creating a Landscape Area Plan is simple:

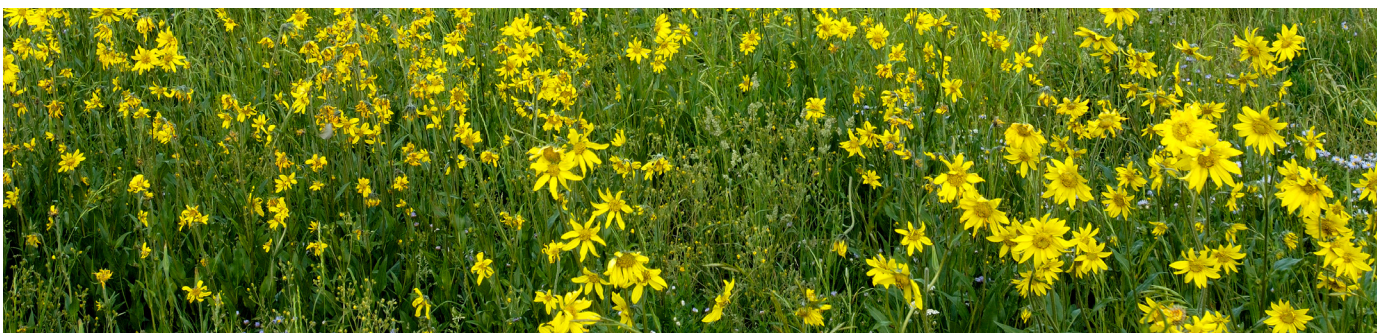
1. Determine the types of plants, trees, lawn/turf or grasses you wish to plant together in hydrozones (low, medium, high water-use plants) using the Mammoth Lakes Recommended Plant list as a guide.
2. Draw each hydrozone on the site plan and number each zone.
3. Calculate the approximate area (square feet) of each zone.
4. Determine the Plant Factor for each zone (see below) and include it on the site plan.

PLANT FACTORS

A Plant Factor is a number between 0.1 and 1.0 that indicates the relative amount of water a given plant needs. The Plant Factors for each recommended plant are found in the Mammoth Lakes Recommended Plant List. The Plant Factors are as follows:

- Low water-use plants: 0.2
- Medium water-use plants: 0.5
- High water use plants: 1.0
- Turf or lawn: 1.0

Although it is not recommended, if you decide to include a mixture of plants with different water needs and Plant Factors in a hydrozone, you should assign the highest Plant Factor to the entire zone.



SUBMITTAL REQUIREMENTS:

Overview and Description

PROJECT PLANT SCHEDULE

A Project Plant Schedule is a detailed list of the plant species within your landscape. This list should be broken up by Hydrozone (Hz) and will serve as evidence that each Hydrozone is in fact low, medium or high water use by demonstrating that the majority of plants within it require that level of water use. At minimum this list should contain:

- Species Common Name
- Species Latin Name
- Water usage (low, medium or high)
- The estimated % of hydrozone that is comprised of that species

BASIC IRRIGATION PLAN

A Basic Irrigation Plan is a simplified layout of the irrigation system. It does not have to be drafted by an irrigation designer so long as the system is designed and installed correctly, and the plan accurately reflects the irrigation elements present in the landscape. Figure 5 shows a basic Irrigation Plan, which should include the following:

- Location of the property's water meter(s). Contact the Mammoth Community Water District if you are unsure of the location of your meter(s). A separate meter for landscaping may be required.
- Location of backflow preventer. Backflow preventers are required to prevent contamination of the Mammoth Lakes water supply.
- Label each hydrozone with the type of irrigation emission devices to be used (e.g. drip, soaker hoses, rotor sprayheads, etc.)
- Locations of system hook-ups (e.g. rotor, drip low volume, drip medium volume, etc.)
- Location(s) of pressure regulation valve(s). Pressure regulation is required and set to 60 pounds per square inch unless the need for higher pressure is demonstrated.

MAINTENANCE SCHEDULE

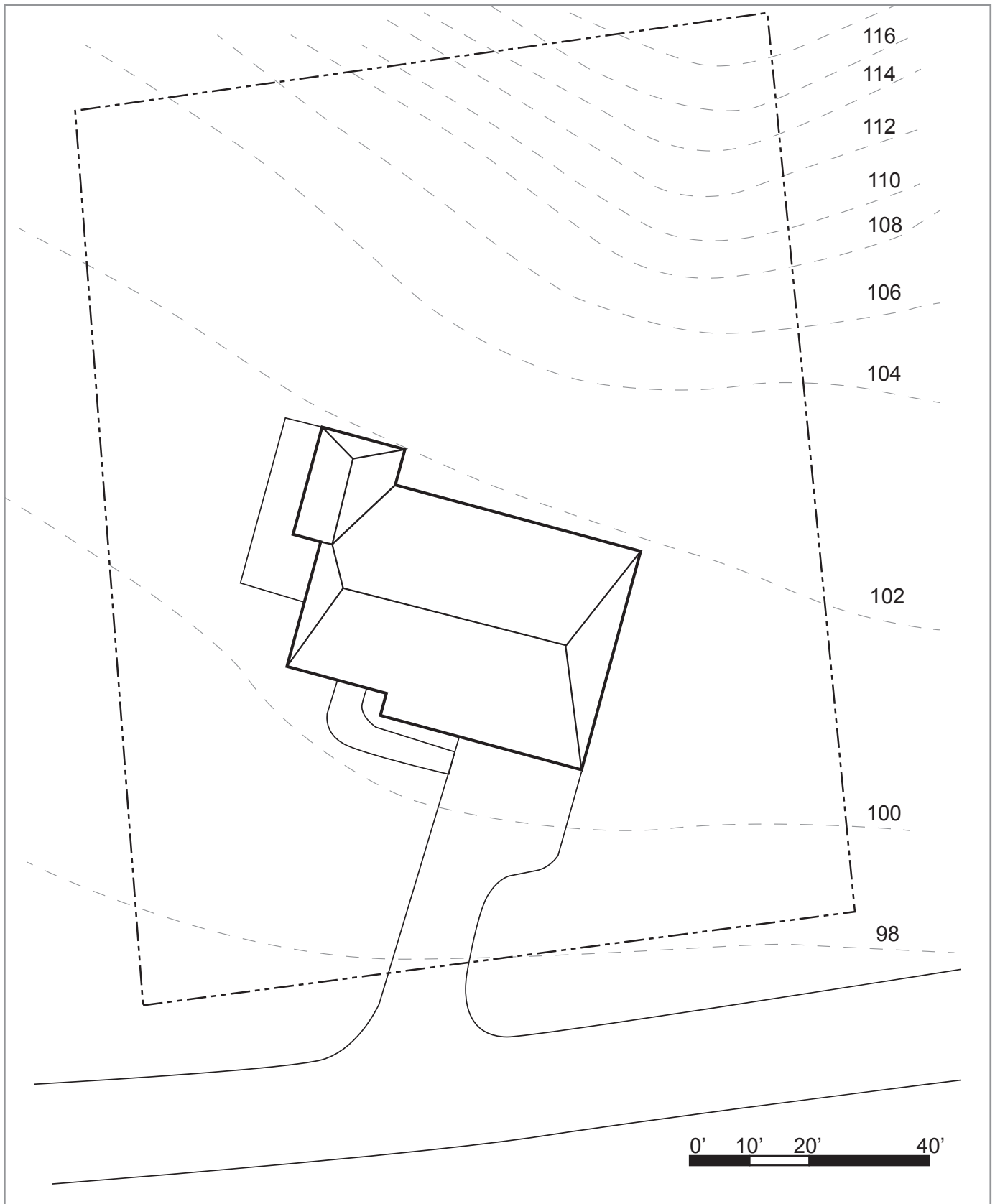
If not properly maintained, a water efficient irrigation system can become inefficient over time. Nozzles, valves, and hoses can break, become clogged, or have other failures. Landscape areas must be properly maintained so that they use irrigation water most efficiently. You can monitor how your irrigation system is working, once installed, with the Maintenance Schedule on page 16.

WATER BUDGET WORKSHEET

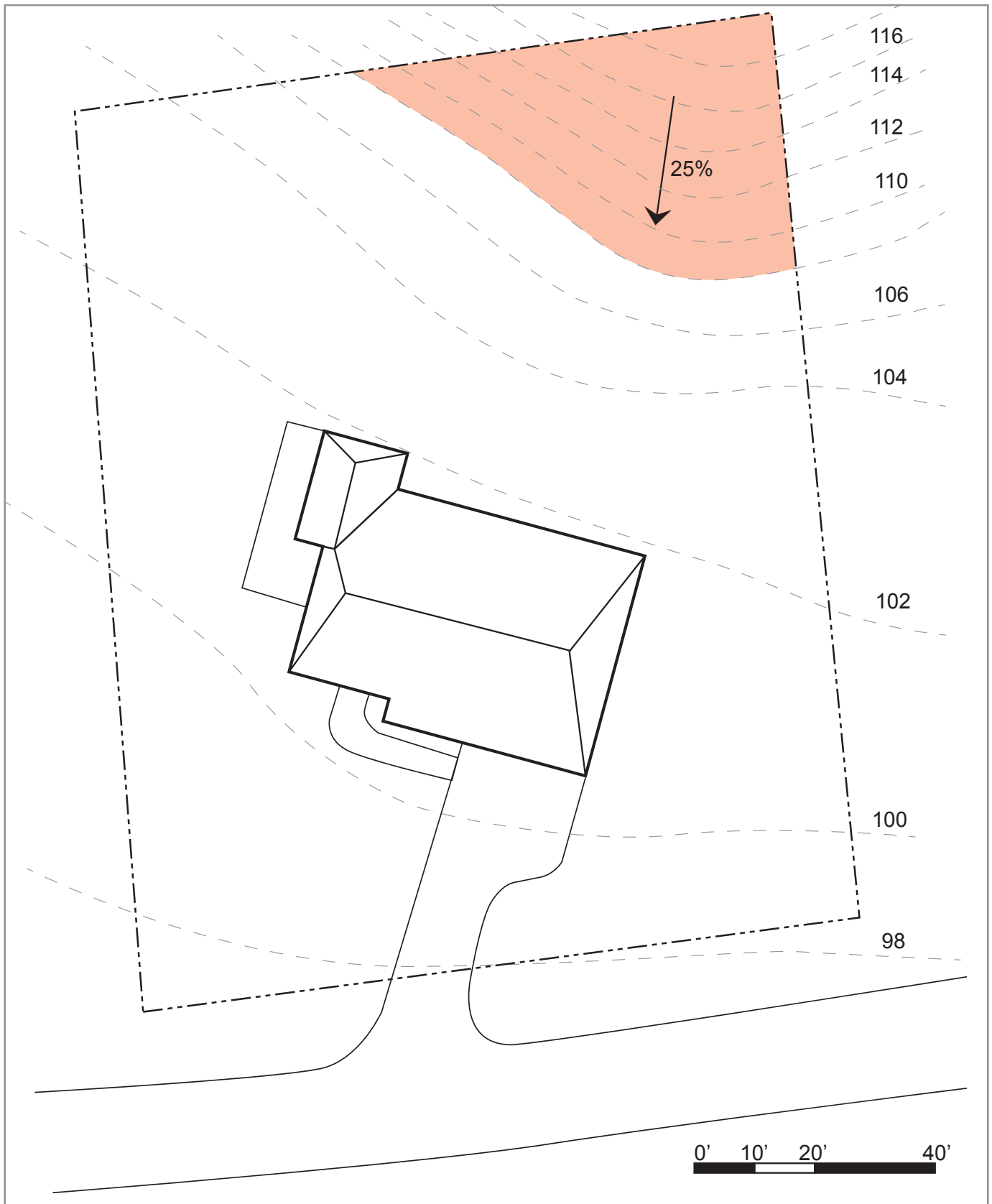
- **Maximum Applied Water Allowance (MAWA)**- this number determines the maximum gallons of water a landscape is allowed to consume in a given year to comply with the Mammoth Lakes Water Efficient Landscape Regulations. An equation combines environmental factors specific to Mammoth Lakes and the amount of landscape area and special landscape area within your property to determine a reasonable and efficient amount of water to be allowed.
- **Estimated Total Water Usage (ETWU)** - this number is an estimate of the amount of water you can expect your landscape to actually use. This takes into account environmental factors and landscape areas just like the MAWA equation, but also factors in the type of plants included in your landscape. This number must be equal to or less than the MAWA in order for a landscape to comply with the Mammoth Lakes Water Efficient Landscape Regulations. The more prevalent low water use plants are in your landscape the more likely you are to reach an ETWU that complies.



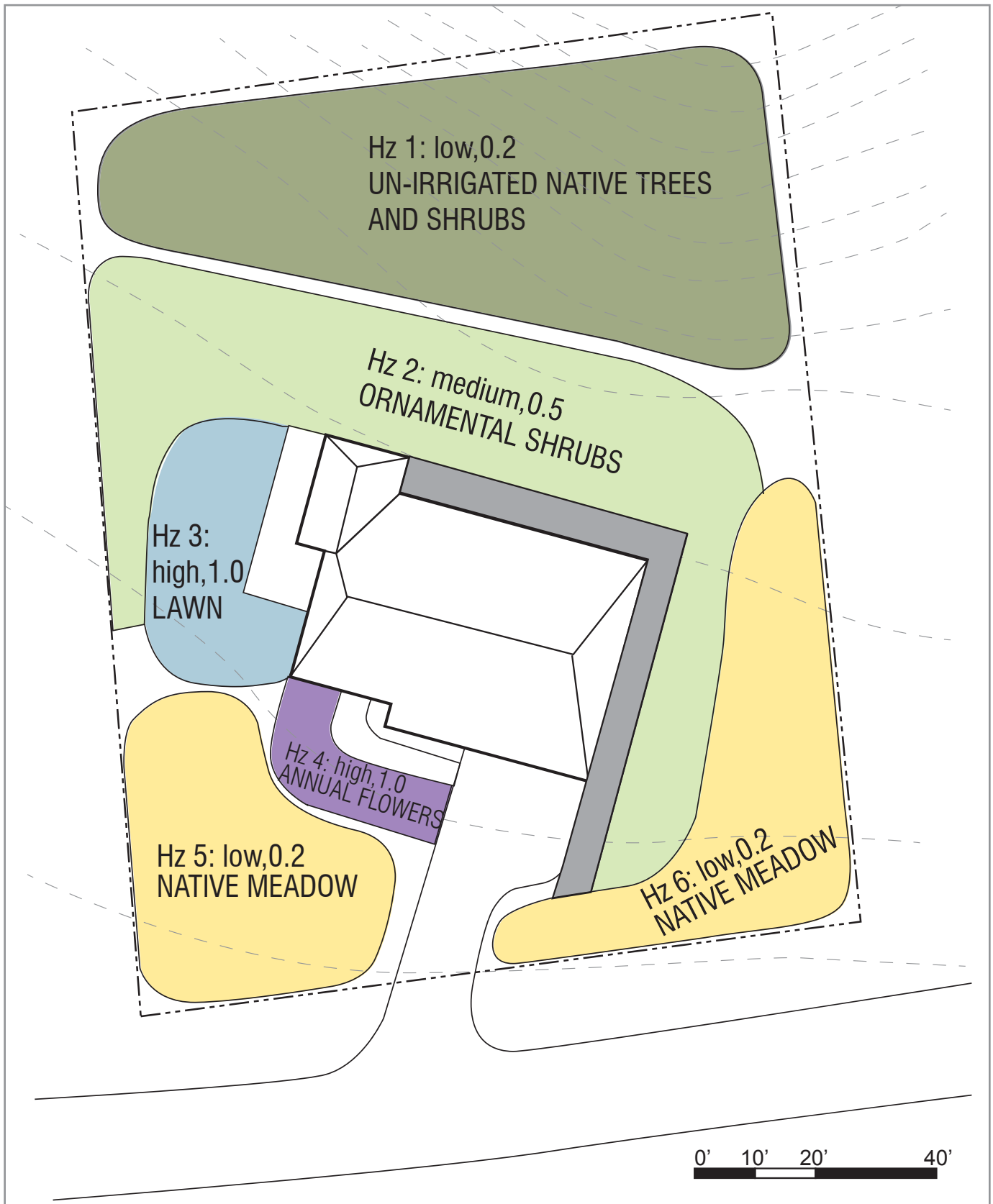
SUBMITTAL REQUIREMENTS:
Figure 2: Site Plan



SUBMITTAL REQUIREMENTS
Figure 3: Slope Plan



SUBMITTAL REQUIREMENTS:
Figure 4: Landscape Area Plan



SUBMITTAL REQUIREMENTS

Figure 5: Project Plant Schedule

Project Plant Schedule

Mammoth Lakes Water Efficient Landscape Regulations

Project Address:

Project Owner:

Project Designer:

Project Installer:

Total Landscape Area:

HzA= Estimated % of hydrozone

The HzA proves that a hydrozone is dominated by plant species that match it's claimed water use

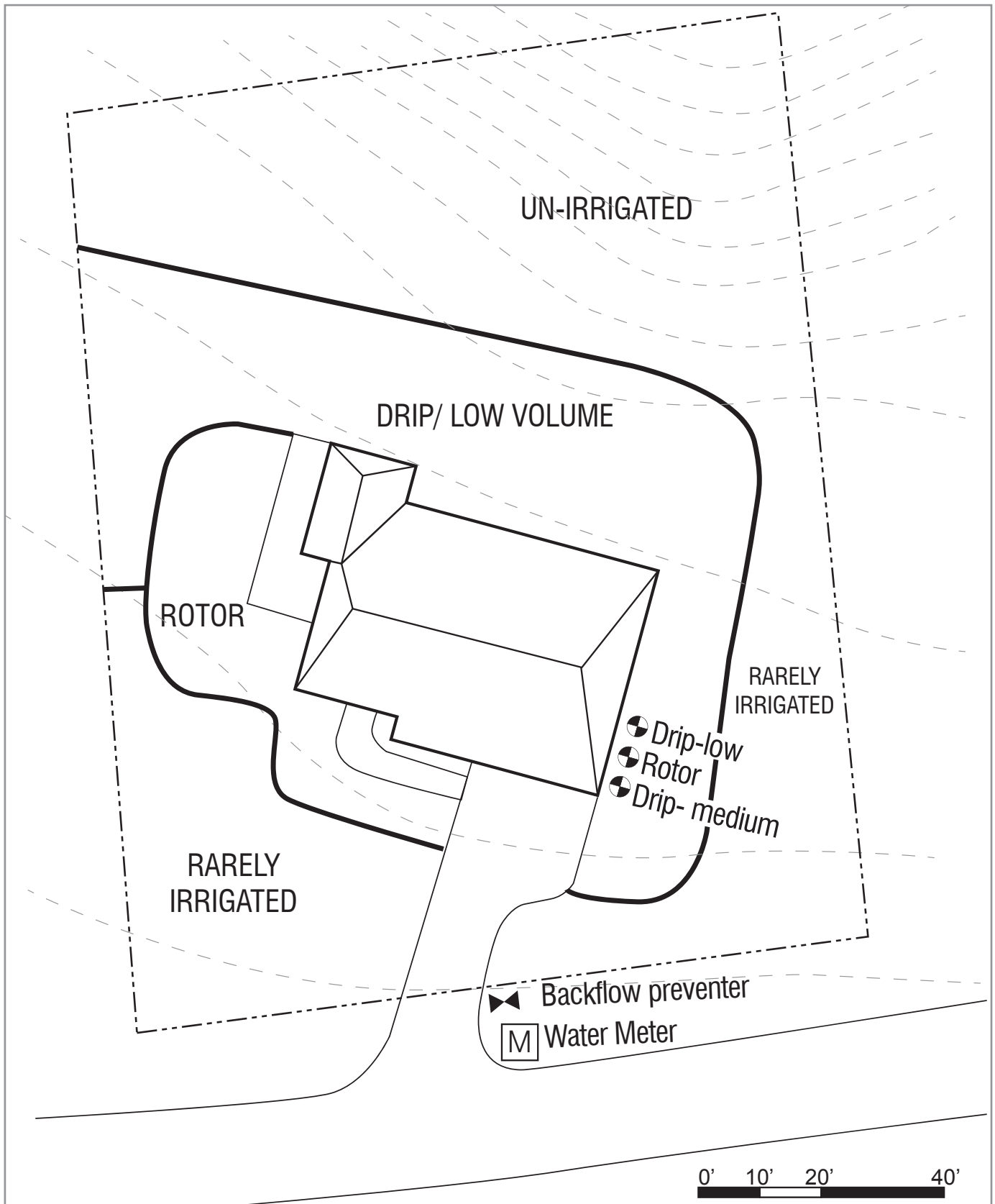
Hydrozone: 1		Total area in Hydrozone: 400sq ft	
Common Name	Latin Name	Water Usage	HzA
Indian Rice Grass	<i>Achnatherum hymenoides</i>	low	10%
Squirrel Tail	<i>Elymus elymoides ssp. Californicus</i>	low	20%
Needle and Thread Grass	<i>Hesperostipa comata</i>	low	20%
Sheep Fescue	<i>Festuca trachyphylla</i>	low	30%
Mountain Brome	<i>Bromus cerniatus</i>	med	10%
Buckwheat	<i>Eriogonum spp</i>	low	5%
Blue Wildrye	<i>Elymus glaucus</i>	high	5%

Example

Hydrozone:		Total area in Hydrozone:	
Common Name	Latin Name	Water Usage	HzA

Hydrozone:		Total area in Hydrozone:	
Common Name	Latin Name	Water Usage	HzA

SUBMITTAL REQUIREMENTS:
Figure 6: Basic Irrigation Plan



SUBMITTAL REQUIREMENTS

Figure 7: Maintenance Schedule

Maintenance Schedule

Mammoth Lakes Water Efficient Landscape Regulations

Project Address:

Project Owner:

Project Designer:

Project Installer:

Total Landscape Area:

[illegible]

Water Budget Worksheet (not required for Option A)

Mammoth Lakes Water Efficient Landscape Regulations

Project Address:

Project Owner:

Project Designer:

Project Installer:

Total Landscape Area:

Enter this information

Input landscape area (sq ft) sq feet

Input Special Landscape Area sq feet

	ETo Mammoth Lakes	Conversion factor	ETAF LA	ETAF SLA	MAWA (gallons/year)
MAWA =	33.00	0.62	0.7	1	37,237.2

HYDROZONE (show on landscape plan)	Plant Water Use Type	Plant Factor	Hydrozone sq. ft.	PF x HA sq ft	Comments
1	low	0.2	600.00	120.00	
2	low	0.2	1000.00	200.00	
3	medium	0.5	200.00	100.00	
4	high	1	100.00	100.00	
5	low	0.2	400.00	80.00	
6	medium	0.5	300.00	150.00	
7				0.00	
8				0.00	
9				0.00	
10				0.00	
11				0.00	
12				0.00	
13				0.00	
14				0.00	
15				0.00	
16				0.00	
total landscape area =			2,600.00	750.00	

Enter this information

ETWU =

PLANT FACTORS

water use	plant factor
low	0.2
moderate	0.5
high	1

the Water Budget Worksheet does the math for you!

MAWA = [(ETo) (0.62) (0.7 x LA)] + [(ETo) (0.62) (1.0 x SLA)]
MAWA = [(33) (0.62) (0.7 x 2,600)] + [(33) (0.62) (1.0 x 0)]
MAWA = [(33) (0.62) (1,820)] + [(33) (0.62) (1.0 x 0)]
MAWA = [(33) (0.62) (1,820)] + [(33) (0.62) (0)]
MAWA = [37237.2] + [0]
MAWA = 37237.2 gallons per year

ETWU=(ETo)(0.62)((PF x HA)/IE)+ SLA)
ETWU=(33)(0.62)((750/.71)+ 0)
ETWU=(33)(0.62)((750/.71)+ 0)
ETWU=(33)(0.62)(1,056.3380...)
ETWU=21,612.7 gallons per year

MAMMOTH LAKES RECOMMENDED PLANT LIST

Designing a landscape with a palette of plants and trees from the Mammoth Lakes Recommended Plant List will result in a beautiful and water-efficient landscape that will complement the natural alpine surroundings. Plants are listed by their Latin names, common names, and variety (where applicable). Each plant or tree is also labeled as to whether it is low, medium, or high water-use. Some plants on the list have been denoted as having possible “aggressive” tendencies, meaning that they will seed freely without water outside the area in which originally planted (in Mammoth Lakes). In recent years, there have been Penstemon and Aster species introduced in Mammoth that have demonstrated aggressive tendencies. Pre-packaged “wildflower” seed mixes are not recommended for Mammoth’s gardens. The mixes often include seeds that have aggressive tendencies and will crowd out other species in the mix, leaving home gardens with only one kind of flower.” However, this does not include custom seed mixes carefully picked for restoration purposes.

Grasses					
Latin Name	Common Name	Variety	Origin	Fire	Water Use
<i>Achnatherum hymenoides</i>	Indian Rice Grass		Native	low	low
<i>Achnatherum</i> spp	Needlegrass		Native	low	low
<i>Bouteloua gracilis</i>	Blue Grama	'Blonde Ambition'		low	low
<i>Calamagrostis</i>	Feather Reed Grass	'Karl Forester'		high	medium
<i>Hesperostipa comata</i>	Needle and Thread Grass		Native		low
<i>Leymus cinereus</i> *	Great Basin Wild Rye		Native	low	low
<i>Panicum virgatum</i>	Switchgrass	'Prairie Sky'		low	low
<i>Schizachyrium scorparium</i> *	Little Blue Stem				low
Perennials					
Latin Name	Common Name		Origin	Fire	Water Use
<i>Achillea millefolium</i> *	Yarrow		Native	low	low
<i>Agastache cana</i>	Hummingbird Mint				medium
<i>Alyssum montanum</i>	Mountain Gold				low
<i>Alyssum wulfenianum</i>	Madwort				low
<i>Angelica lineariloba</i>	Sierra Angelica				low
<i>Aquilegia</i>	Columbine		Native	low	low
<i>Artemisia schmidtiana</i>	Artemisia	'Silver Mound'			low
<i>Aster alpinus</i>	Mountain Aster				medium
<i>Aurinia saxatilis</i>	Basket of Gold				low
<i>Centaurea cineraria</i>	Dusty Miller				low
<i>Chamerion angustifolium</i>	Fireweed				low
<i>Clematis montana rubens</i>	Virgin's Bower				medium
<i>Coreopsis grandiflora</i>	Coreopsis				low
<i>Dianthus</i>	Sweet William, Pinks				medium
<i>Delphinium</i>	Larkspur		Native		medium
<i>Epilobium canum</i>	California Fuchsia				low
<i>Eriogonum</i> spp	Buckwheat				low
<i>Erysimum capitatum</i>	Wallflower		Native		medium
<i>Eschscholzia californica</i>	California Poppy				low
<i>Hemerocallis</i>	Daylily				low
<i>Hyssopus officinalis</i>	Hyssop				low
<i>Iberis sempervirens</i>	Candytuft				medium
<i>Ipomopsis aggregata</i>	Gilia, star or scarlet				low
<i>Lavendula</i> spp	Lavender				low
<i>Linum lewisii</i>	Blue Flax			low	low
<i>Lupinus</i> spp.	Lupine		Native	low	low
<i>Mimulus</i> spp.	Monkeyflower				medium
<i>Monarda didyma</i>	Bee balm			low	medium
<i>Monardella odoratissima</i>	Pennyroyal				low
<i>Nepeta x faassenii</i>	Catmint				low
<i>Oenothera caespitosa</i>	Evening Primrose		Native		low
<i>Paeonia</i>	Herbaceous Peony				medium
<i>Papaver orientale</i>	Oriental Poppy				medium
<i>Penstemon newberryi</i>	Penstemon		Native	low	medium
<i>Penstemon heterodoxus</i>	Penstemon		Native	low	medium
<i>Penstemon rostriflorus</i>	Penstemon		Native	low	medium
<i>Penstemon speciosus</i>	Showy Penstemon				low
<i>Phlox paniculata</i> , <i>P. suffruticosa</i>	Phlox				medium

*=Aggressive

MAMMOTH LAKES RECOMMENDED PLANT LIST:

Perennials (continued...)					
Latin Name	Common Name		Origin	Fire	Water Use
Potentilla gracilis	Five-finger Cinquefoil				low
Potentilla glandulosa	Sticky Cinquefoil				low
Pulmonaria saccharata	Bethlehem sage				medium
Salvia spp	Blue Salvia				medium
Scabiosa caucasica	Pincushion Flower				medium
Sedum spurium	Stonecrop	'Dragon's Blood'			low
Sedum telephium	Stonecrop	'Autumn Joy' 'Indian Chief'			low
Silene acaulis	Cushion Pink				low
Silene schafta	Moss Campion				medium
Stachys lanata	Lamb's Ear				low
Stokesia laevis	Stokes Aster				medium
Solidago canadensis	Goldenrod				low
Thalictrum	Meadow Rue				medium
Low Shrubs and Groundcovers					
Latin Name	Common Name		Origin	Fire	Water Use
Arctostaphylos uva-ursi	Bearberry				low
Artemisia abrotanum	Old Man Southernwood				low
Artemisia tridentata	Great Basin Sagebrush			high	low
Berberis thunbergii	Japanese Barberry				low
Campanula poscharskyana	Serbian Bellflower				medium
Cerastium tomentosum	Snow-in Summer				medium
Cotoneaster divaricatus	Spreading Cotoneaster				medium
Cotoneaster horizontalis	Rock Cotoneaster				medium
Eriogonum umbellatum	Sulfur Buckwheat		Native		low
Euonymus alatus*	Dwarf Winged Burningbush				medium
Euonymus fortunei	Wintercreeper				medium
Galium odoratum	Sweet Woodruff				medium
Parthenocissus quinquefolia	Virginia Creeper				medium
Phlox subulata	Moss Pink				medium
Pinus mugo mugus	Mugo Pine			high	low
Potentilla fruticosa	Shrubby Potentilla		Native		medium
Potentilla tabernaemontani	Spring Cinquefoil				medium
Purshia tridentata	Antelope Bitterbrush		Native	high	low
Rhus aromatica	Fragrant Sumac				low
Ribes aureum	Golden Currant				low
Ribes cereum	Wax Currant		Native		low
Salix exigua	Coyote Willow		Native		high
Sedum spp	Stonecrop				low
Spiraea billiardi	Spiraea				medium
Symphoricarpus rotundifolius	Mountain Snowberry		Native	unknown	low
Thymus pseudolanuginosus	Woolly Thyme				medium
Veronica incana	Woolly Speedwell				medium
Viburnum opulus	Dwarf European Cranberry Bush	'Nana'			low
Large Shrubs					
Latin Name	Common Name		Origin	Fire	Water Use
Amelanchier laevis	Shadblow Serviceberry				medium
Amelanchier utahensis	Shadbush		Native		medium
Amelanchier alnifolia	Shadbush		Native		low
Chamaebatiaria millifolium	Fernbush		Native		low
Cornus alba	Siberian Dogwood	'Sibirica'			low
Cornus sericea	Creek Dogwood		Native	low	high
Cornus stolonifera	Redtwig Dogwood				medium
Forsythia	Forsythia				low
Hamamelis	Witch Hazel				medium
Kolkwitzia amabilis	Beauty Bush				low
Malus pumila	Hedge Crabapple	'Centurion'			medium
Myrica pennsylvatica	Bayberry				medium
Prunus besseyi	Western Sand Cherry				medium
Prunus emarginata	Bittercherry		Native		medium
Rhus trilobata	Skunkbush Sumac				low
Rhus typhina	Staghorn Sumac				low

*=Aggressive

MAMMOTH LAKES RECOMMENDED PLANT LIST:

Large Shrubs (continued...)					
Latin Name	Common Name		Origin	Fire	Water Use
Rosa harrisonii	Harrison Rose				low
Rosa woodsii	Wood's Rose		Native		low
Sambucus caerulea, S. glauca	Blue Elderberry		Native		low
Syringa vulgaris*	Common Lilac and hybrids				low
Viburnum lantana V. dentatum*	Viburnum				low
Shrubs to Small Trees					
Latin Name	Common Name		Origin	Fire	Water Use
Acer glabrum	Mountain Maple		Native		medium
Aronia melanocarpa	Chokecherry, Black				low
Cercocarpus ledifolius	Mountain Mahogany		Native	high	low
Malus scheideckeri	Scheidecker Crabapple				medium
Rhus glabra	Smooth Sumac				low
Medium Trees					
Latin Name	Common Name		Origin	Fire	Plant Factor
Acer ginnala	Amur Maple				low
Betula occidentalis	Western Water Birch		Native		medium
Malus floribunda	Japanese Crabapple				medium
Malus ioensis plena	Bechtel Crabapple				medium
Pinus aristata	Bristlecone Pine			high	low
Pinus flexilis	Limber Pine				medium
Pinus nigra	Austrian Black Pine				medium
Pinus thunbergii	Japanese Black Pine				medium
Populus tremuloides	Quaking Aspen		Native	low	high
Prunus padus 'Plena'	European Bird Cherry				medium
Sorbus aucuparia	Mountain Ash				low
Large Trees					
Latin Name	Common Name		Origin	Fire	Water Use
Gymnocladus dioica	Kentucky Coffee Tree				low
Liquidambar styraciflua	American Sweetgum	'Palo Alto'			high
Malus baccata	Siberian Crabapple				medium
Pinus contorta	Lodgepole Pine		Native	high	medium
Pinus jeffreyi	Jeffrey Pine		Native	high	low

*=Aggressive

INVASIVE SPECIES AND FIRE-HAZARD PLANTS

The following list of plants are undesirable in Mammoth Lakes because they are highly flammable and/or are known invasive species. In Mammoth Lakes an invasive species is a non-native plant that is known to have spread (naturalized) in the wild and can crowd out native species. This list is not comprehensive. If you are considering landscape plants that are not on the Mammoth Lakes Recommended Plant List, it is strongly recommended that you research recent studies and invasive plant lists, which are frequently updated.

Fire Hazard Plants	
Latin Name	Common Name
Artemisia spp	Sage or Wormwood
Calamagrostis acutiflora	Feather Reed Grass
Calocedrus decurrens	Incense Cedar
Cedrus atlantica "Glaucous"	Blue Atlas Cedar
Chrysothamnus nauseosus	Rubber Rabbitbrush
Cupressus glabra	Arizona Cypress
Cytisus spp	Broom
Genista spp	Dwarf Broom
Juniperus spp	Juniper
Picea glauca "Conica"	Dwarf Alberta spruce
Picea pungens	Spruce
Sequoiadendron giganteum	Giant Redwood
Thuja occidentalis	Arborvitae

Invasive Plant Species	
Latin Name	Common Name
Rubus discolor	Himalayan Blackberry
Bromus tectorum	Cheatgrass
Cirsium vulgare	Bull Thistle
Leucanthemum vulgare	Ox-eye Daisy
Brassica nigra	Black Mustard
Centaurea melitensis	Tocalote "Starthistle"
Verbascum thapsus	Wooley Mullein
Vinca minor	Periwinkle
Cytisus scoparius	Scotch Broom
Elaeagnus angustifolius	Russian Olive
Robinia pseudoacacia	Black Locust
Salvia aethiops	Mediterranean Sage
Saponaria officinalis	Bouncingbet or Soapwort

TOWN OF MAMMOTH LAKES DESIGN GUIDELINES

Town of Mammoth Lakes

A GUIDE TO ESTIMATING IRRIGATION WATER NEEDS OF LANDSCAPE: The Landscape Coefficient Method and WUCOLS

University of California Cooperative Extension

<http://www.water.ca.gov/wateruseefficiency/docs/wucols00.pdf>

GENERAL GUIDELINES FOR CREATING DEFENSIBLE SPACE (2006)

State of California Board of Forestry and Fire Protection, California Department of Forestry and Fire Protection

ORDINANCE 2010-01

Board of Commissioners Mammoth Lakes Fire Protection District

TAHOE REGIONAL PLANNING AGENCY BMP HANDBOOK (2011)

Tahoe Regional Planning Agency

HOME LANDSCAPING GUIDE FOR LAKE TAHOE AND VICINITY

University of Nevada Cooperative Extension