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# APPENDIX II

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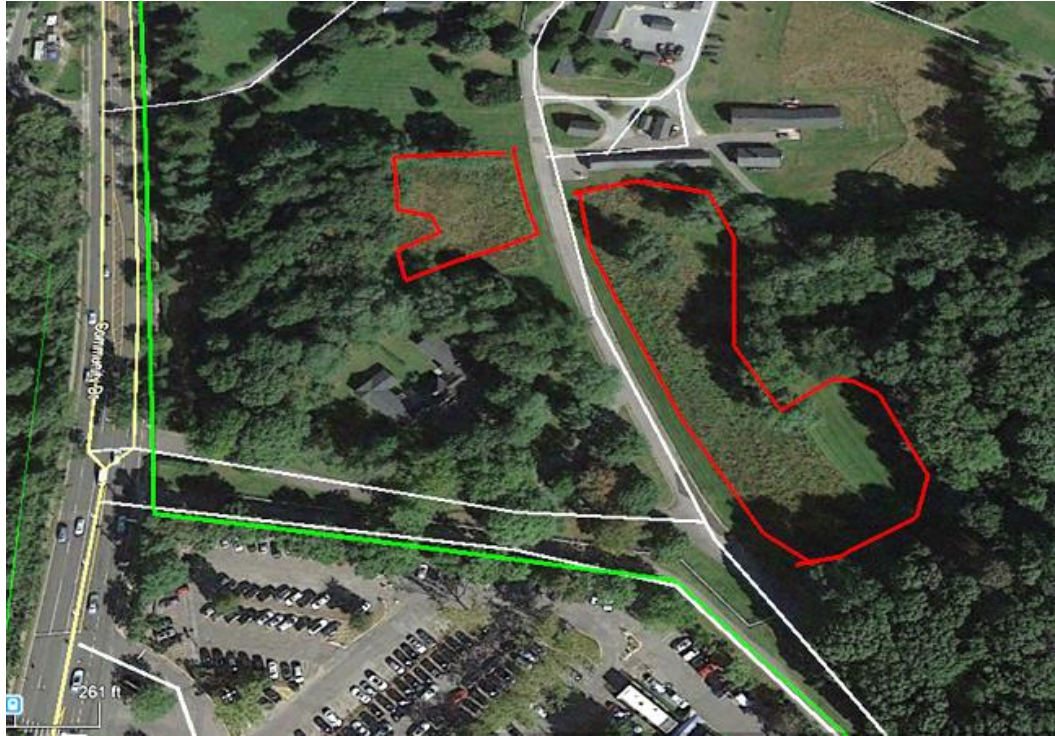
Specific Descriptions and Prescriptions for the  
Greentree Prescribed Burn Plan 2020 – 2024  
BEHAVE Plus Outputs for the involved fuels

JANUARY, 2020

RISKY BUSINESS INCIDENT MANAGEMENT LLC  
259 Brown Road, Voluntown, Ct 06384

# Unit G1 SW Corner of Greentree

**Fuel Model Gr3, Low Load, Very Course Humid Climate Grass**



**General Information:**

1.9 acres in two portions separated by paved roadway.

Urban interface to the South and West including the 800 bed Class I trauma center Northwell Hospital immediately to the south. Community Drive is 300 feet West of the unit, and there are Greentree buildings 100 feet to the SW through the woods in the small portion of the unit west of the paved Greentree Road that bisects the unit. On the east side of this paved road the Greentree vehicle fuel station is adjacent to the larger portion of this unit.

Wide mowed grass perimeter precluding escapes except for spotting. The primary concern is smoke management and public awareness.

The small portion of the unit slopes from West to East so with SW winds ignition should be a backing fire from the road that will back against the wind, but will want to run upslope.

Ideal wind vector SW.

**Detailed Description and Prescription:**

**Fuels and Topography**

Fuel Model Gr3, Low Load, Very Course Humid Climate Grass. The larger part of the unit on the east side of the Greentree access road is gently sloped with a southwest aspect and the smaller unit to the west of that road has about a ten percent slope with an east aspect.

**Urban Interface**

As stated above the Northwell Hospital grounds to the South, Community Drive and Greentree buildings to the East, Greentree building and fueling station at North tip of the unit.

**Prescription Discussion and Ignition Techniques to be Employed**

The most important aspect of the prescription is the wide vector with a SW wind being the optimal direction for smoke management concerns.

With winds in prescription the test fire should be ignited near the NE corner of the portion of the unit to the east of the Greentree access road. Once the test fire is established as successful ignitions should continue as backing fires building a firm anchor point in this corner of the burn and carrying the fire up the eastern and northern flanks. Note these backing ignitions are on the high ground of this western aspect. Once backing fire has blacked out sufficient holding space narrow head strips can be ignited. Actual fire behavior, slope effects and smoke dispersion will dictate the width of these strips and pace of ignitions.

Across the road the smaller portion of this unit will need to be burned from east to west (due to rx wind vectors) which means initial ignitions will need to be at the toe of the slope of this west

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aspect. A second set of lighters holders will need to be positioned at the top of the west flank of this unit as ignitions begin below. This is a watch out since these firefighters will be upslope fire the backing fires below. LCES will be firmly established prior to positioning them there. They are there to contain any spots generated from the fire below them, but also might need to ignite the high ground at the top of this portion of the unit and let the SW winds drive it down slope to meet the backing fires created below.

**Staffing**

Ideally we would have Burn Boss plus 2 squads. Squads would consist of 1 Squad Boss, 2 FFT2 plus 2 Greentree apparatus with operators. A dedicated smoke monitor will also be assigned to patrol and document smoke conditions on Community Drive and the Northwell Hospital parking areas.

**Prescription:**

<b>Factor</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Comments</b>
Season			Burn in any season, Mar/April or Sept/Oct ideal
Wind Direction	South to West	South to West	SW wind ideal
Wind Speed Mid-flame	0	9	Note this is mid-flame windspeed, not 20'. Predicted 20' windspeed is what is shown in NWS Fire Weather Forecasts (mid-flame windspeed=0.44X20'windspeed in grass fuels)
Wind Gust Mid-flame		12	
Fine Fuel Moisture	6%	16%	FFM below 6% was constrained in prescription to prevent Probability of Ignition of flaming brands to exceed 60%
Mixing Height	1000'	No max	
Transport Winds	South to West	South to West	
Relative Humidity	30%	80%	
Temperature	37	100	Mid 60's ideal temp.
*Days since wetting rain	1	6	*note this is recommended not REQUIRED prescription parameter

**For predictive info on Rate of Spread, Head Flame Length and Probability of Ignition please refer to the Behave Plus data at the end of this Appendix, Fuels GR3. Bear in mind that ignition techniques using narrow strip heads will not allow for full development of head fire flame lengths.**

# G2 Unit N Corner of Greentree

## Fuel Model Gr6, Moderate Load, Humid Climate Grass (50%) and Gr5, Low Load Humid Climate Grass (50%)

### **General Information:**

3.25 acres perimeter, but only 2.5 acres are in restored grasses to burn.

Urban interface on three sides including residential area and school to the west, shopping mall to the north and Shelter Rock Road to the east.

Wide mowed grass perimeter precluding escapes except for spotting. The primary concern is smoke management and public awareness.

Slopes from North to South; 11% SLOPE

Ideal wind vector NW to NE but properly applied strip ignition techniques combined with real time smoke monitoring can widen the window.



*G2 Unit slopes from South to North*

## Detailed Description and Prescription:

### Fuels and Topography

Fuel Model Gr6, Moderate Load, Humid Climate Grass (50%) and Gr5, Low Load Humid Climate Grass (50%)

This new Unit for the Greentree Burn Plan is 3.25 acres, but the burnable fuel acreage is actually 2.5 acres. The reason for this is that there are wide mowed buffers surrounding the interior area where native grasses and forbs have been planted for restoration. The unit basically runs uphill from a timbered wet drainage to the south and climbs on an 11% slope to the Greentree boundary line to the north. The fuels consist of Fuel Model Gr6, Moderate Load, Humid Climate Grass



*View SE from the N edge*

(50%) and Gr5, Low Load Humid Climate Grass (50%). As can be seen in the photo at left the heavier grasses are primarily in the center of the unit. Since the Gr6 model is the dominant and heaviest

burnable fuel loading the BehavePlus runs were based upon this fuel. The other fuel beds will either burn with less intensity and in some areas only on a patch by patch basis. There are 2 spruce trees in the interior and 1 more spruce on the eastern edge that will require either pre-treatment or careful burnout/holding with backpack pumps during ignition. The top of the slope has a wide mowed buffer between the grass fuels and the 60-100' deep mixed hardwood and conifer forest at the summit of the hill.

### **Urban Interface**

This unit is closely surrounded by multiple commercial, residential and office structures and community infrastructure as well as heavily used roadways. Greentree officials state that the residential community just west of the burn unit frequently reports concerns to Greentree



*View to the East from North edge*

about issues like dead trees in the woods adjacent to their properties. The unit is well bounded by mowed fire breaks, the fuels are not conducive to long range spotting and the prescription parameters reduce spotting potential. With those facts in place escaped fire is extremely unlikely. The primary concern is smoke management. Smoke impacts will be mitigated by both the prescription and ignition techniques, thereby significantly reducing the potential for negative smoke impacts.

### **Prescription Discussion and Ignition Techniques to be Employed**

The prescription table (below) contains parameters that minimize smoke production, restrict burning unless good atmospheric ventilation is present, and include wind vectors that minimize exposure to the surrounding public and infrastructure. That statement is especially true if burning under parameters that are on the “dry end” of the prescription. Simple stated: dry grasses burn quickly and clean with minimal smoke production; the wetter the grasses the slower the burn and due to moisture present in the fuels creates more smoke.

The ideal wind vectors of this prescription (NW to NE) would allow for the widest range of ignition options and smoke mitigations. Winds vectoring anywhere within the arc of NW to NE would drive the smoke away from the residential community to the W, the shopping center to the N and away from Shelter Rock Road to the E. With winds in this vector the most likely ignition pattern would be to start with backing fires off the south flank of the unit, carry fire up the E & W flanks, followed by spot ignitions mid slope. Once fire is established in the center, fire then could likely be ignited at the top of the slope on the north end of the unit. This wind vector would carry the majority of the smoke onto the Greentree property interior.

Other than the “ideal” wind vectors this prescription does allow for burning on winds in the arcs from W to NW and NE to E. While both these addition vector arcs allow for wind to be blowing directly at either the residential area to the W or Shelter Rock Road to the E it is felt that very careful, narrow and slow strip ignition techniques can eliminate smoke issues. In either of these cases ignitions would commence along the downside flank (E or W depending on winds burn day). A backing line would be ignited at the edge of the green. This would be followed up with

very narrow strip heads (1-2 feet) in short sections. Smoke would constantly be monitored allowing for stopping burning, slowing down burning or increasing burning if desirable results are achieved. **For predictive info on Rate of Spread, Head Flame Length and Probability of Ignition please refer to the Behave Plus data at the end of this Appendix, Fuels GR5 & GR6. Bear in mind that ignition techniques using narrow strip heads will not allow for full development of head fire flame lengths.**

**Staffing**

The Greentree Burn Plan requires Burn Boss plus 2 trained wildland firefighters and the Greentree staff and equipment as minimum staffing, but for this burn we boost the trained wildland firefighters to 4 in addition to Burn Boss and Greentree staff and equipment. That total staffing would then include the Burn Boss plus 6 firefighters with the Greentree staff in addition. A dedicated smoke monitor will be assigned to patrol and document smoke conditions in the shopping center to the N and NW, Shelter Rock Road to the E and houses to the W.

**Prescription: Unit G2**

Factor	Minimum	Maximum	Comments
Season			Burn in any season, Mar/April or Sept/Oct ideal
Wind Direction	W to N to E	W to N to E	NW to NE winds ideal, but smoke will be mitigated by narrow strip head ignitions. If winds are due west or due east extremely narrow strips will be used at the eastern or western sides during initial ignitions to minimize smoke impacts to residential areas & Shelter Rock Road.
Wind Speed Mid-flame	0	9	Note this is mid-flame windspeed, not 20'. Predicted 20' windspeed is what is shown in NWS Fire Weather Forecasts (mid-flame windspeed=0.44X20'windspeed in grass fuels)
Wind Gust Mid-flame		12	
Fine Fuel Moisture	6%	16%	FFM below 6% was constrained in prescription to prevent Probability of Ignition of flaming brands to exceed 60%
Mixing Height	1000'	No max	
Transport Winds	Any direction	Any direction	NW to NE transport winds ideal, but smoke will be rapidly dispersed before reaching top of mixing heights. Strip head firing eliminates smoke column development.
Relative Humidity	30%	80%	
Temperature	37	100	Mid 60's ideal temp.
*Days since wetting rain	1	6	*note this is recommended not REQUIRED prescription parameter

# Unit G3 and Unit G4;

**Fuel Model Gr6, Moderate Load, Humid Climate Grass (40%), NB3, Non Burnable Agricultural Fuels (20%) and Gr3, Low Load, Very Coarse Humid Climate Grass (40%)**



**General Information:**

G3 is a relatively circular unit abutting the northern edge of the Greentree property. It consists of a drumlin dome surrounded by roads. It is broken by a hardwood/shrub hedgerow into 14 acre (south) In the south portion, the primary continuous native grass areas are on the steeper slopes (up to 25%) on the southern, western and southwestern aspects of domelike drumlin ridgeline, but the top of the hill now hosts a large volume of native grasses. There are native shrubs embedded into portions of this grassland. The grass prairies are subdivided by roads and burns will be rotated among these patches. Also at the summit is a Quail pen structure and adjacent field. There are also two pole mounted birdhouses embedded in this unit that may need to be protected during ignition.

G4 is the northern field adjacent to G3 and they should be burned together. It is relatively flat, dipping to the west toward the Main House of Greentree. The northeast corner of this field is covered with mowed pasture grasses and drops steeply to the NE to Shelter Rock Road. This steep slope will not be burned. The northern portion to burn is primarily a field of native grasses inside hardwood/shrub hedgerows

Total acreage 15.3.

**Detailed Description and Prescription:**

**Fuels and Topography**

This unit is a domelike drumlin hill. The fuels consist of 40% Gr6 grass and forbs, 20% NB3 non-burning agricultural land and 40% Gr3 grasses and forbs. Since the Gr6 model is the dominant and heaviest burnable fuel loading the BehavePlus runs were based upon this fuel. The other fuel beds will either burn with less intensity or may not burn at all. The main difference in this unit is the slope involved. The majority of the Gr6 fuels are on slopes of up to 25%, and this percent of slope was included in the BehavePlus modeling runs.

Fuel Model Gr6, Moderate Load, Humid Climate Grass (40%), NB3, Non Burnable Agricultural Fuels (20%) and Gr3, Low Load, Very Coarse Humid Climate Grass (40%)

**Urban Interface**

Shelter Rock Road is immediately to the NE of this unit. Otherwise the most likely effected buildings are all Greentree on site structures.

**Prescription Discussion and Ignition Techniques to be Employed**

The ideal wind vectors of this prescription (NW to NE) would allow for the widest range of ignition options, including the possibility of lighting from the base of the south slope of the unit and allowing head and flanking fires to freely burn upslope. However during March thru April

time of the year it is statistically unlikely we would get those wind vectors based on local weather station historic data

Instead with any wind vector this unit can be ignited using strip heads following contour and wind directions in a manner that will reduce smoke impacts outside of the Greentree Foundation property.

**Staffing**

G3 itself is the largest burn unit at Greentree and this plan calls for burning G3 and G4 together. With that in mind it is recommended that total staffing would then include the Burn Boss plus 6 firefighters with the Greentree staff in addition. A dedicated smoke monitor will be assigned to patrol and document smoke conditions along Shelter Rock Road and developed areas adjacent to Greentree.

**Prescription: Fuel Model Gr3, Low Load, Very Course Humid Climate Grass**

<b>Factor</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Comments</b>
Season			Burn in any season, Mar/April or Sept/Oct ideal
Wind Direction	Any Direction	Any Direction	NW to NE winds ideal. With NW to NE winds smoke will not be an issue outside of Greentree Foundation property. If winds are from other vectors narrow strip head ignitions will be required to mitigate smoke impacts outside of Greentree Foundation property.
Wind Speed Mid-flame	0	9	Note this is mid-flame windspeed, not 20'. Predicted 20' windspeed is what is shown in NWS Fire Weather Forecasts (mid-flame windspeed=0.44X20'windspeed in grass fuels)
Wind Gust Mid-flame		12	
Fine Fuel Moisture	6%	16%	FFM below 6% was constrained in prescription to prevent Probability of Ignition of flaming brands to exceed 60%
Mixing Height	1000'	No max	
Transport Winds	Any direction	Any direction	W to N to ESE transport winds ideal, but smoke will be rapidly dispersed before reaching top of mixing heights
Relative Humidity	30%	80%	
Temperature	37	100	Mid 60's ideal temp.
*Days since wetting rain	1	6	*note this is recommended not REQUIRED prescription parameter

Appendix II Specific Prescriptions for Individual Burn Units

**For predictive info on Rate of Spread, Head Flame Length and Probability of Ignition please refer to the Behave Plus data at the end of this Appendix, Fuels GR5 & GR6. Bear in mind that ignition techniques using narrow strip heads will not allow for full development of head fire flame lengths.**

## G5 Unit S of Greenhouse

### Fuel Model Gr6, Moderate Load, Humid Climate Grass (50%) and Gr5, Low Load Humid Climate Grass (50%)



#### **General Information:**

This narrow elongated unit of 1.1 acres is on a short slope in upper east area of Greentree. There are no special values at risk to be protected embedded in this small unit.

The slope is 20% with a SW and W aspect. The heavier Gr6 fuels are the eastern and southern half, with the Gr5 fuels on the northern and western half. The top of the aspect(s) is the eastern flank.

Ideal wind vector NW to NE but properly applied strip ignition techniques combined with real time smoke monitoring can widen the window

This unit was successfully burned in April 12, 2017 by Risky Business Incident Management LLC on a NW wind. The crew was Burn Boss plus 6 firefighters plus Greentree staff of 5.

#### **Detailed Description and Prescription:**

##### **Fuels and Topography**

Gr6 Fuel Model covers about 50% of this unit and is the heavier fuel. Gr5 Fuel Model covers the other 50% of this unit. Fire behavior is predicted at slightly less intensity in the Gr5 portion. As stated above the unit is on a SW aspect with a 20% slope.

### **Urban Interface**

The sites of concern include Shelter Rock Road to the E, the Stone Hill at North Hill gated community of about 60 large homes also to the E and immediately adjacent to the Greentree boundary, and the Unitarian Universalist Congregation at Shelter Rock Church immediately to the SE of this unit. When burned on April 12, 2017 the wind was out of the NW and was the worse wind direction you could have for these values. The strip head ignition technique mitigated the smoke concerns. A smoke monitor was stationed in the Church parking lot for the entire burn. The worse smoke condition reported was a light sheen and odor of smoke. There were no complaints from homeowners, business owners and transportation corridor managers.

### **Prescription Discussion and Ignition Techniques to be Employed**

As shown in the prescription this unit can be burned on any wind vector as smoke emissions will be mitigated by strip head burning patterns

Ignitions will commence on the downwind side of the unit. A backing fire will be ignited to establish an anchor point. Once secure narrow strip head ignitions would be used for the Test Fire into this anchor zone. Upon acceptable fire behavior at the Test Fire, ignitions would continue with strip heads for the remainder of the unit. Ignition pattern will be based on wind direction as well as effects of the 20% slope. Narrow and then wider strip heads would then be lit to burn into the black.

### **Staffing**

This simple burn can be accomplished with the minimal permitted staffing of this plan; Burn boss plus 2 firefighters plus Greentree staff and equipment.

Appendix II Specific Prescriptions for Individual Burn Units

**Prescription:** Fuel Model Gr6, Moderate Load, Humid Climate Grass (50%) and Gr5, Low Load Humid Climate Grass (50%)

Factor	Minimum	Maximum	Comments
Season			Burn in any season, Mar/April or Sept/Oct ideal
Wind Direction	Any direction	Any direction	N to E winds ideal, but smoke will be mitigated by narrow strip head ignitions on this small unit.
Wind Speed Mid-flame	0	9	Note this is mid-flame windspeed, not 20'. Predicted 20' windspeed is what is shown in NWS Fire Weather Forecasts (mid-flame windspeed=0.44X20'windspeed in grass fuels)
Wind Gust Mid-flame		12	
Fine Fuel Moisture	6%	16%	FFM below 6% was constrained in prescription to prevent Probability of Ignition of flaming brands to exceed 60%
Mixing Height	1000'	No max	
Transport Winds	Any direction	Any direction	S to W transport winds ideal, but smoke will be rapidly dispersed before reaching top of mixing heights
Relative Humidity	30%	80%	
Temperature	37	100	Mid 60's ideal temp.
*Days since wetting rain	1	6	*note this is recommended not REQUIRED prescription parameter

**For predictive info on Rate of Spread, Head Flame Length and Probability of Ignition please refer to the Behave Plus data at the end of this Appendix, Fuels GR5 & GR6. Bear in mind that ignition techniques using narrow strip heads will not allow for full development of head fire flame lengths.**

# Unit G6 Walled Garden

## Fuel Model Gr8, High Load, Very Coarse, Humid Climate Grass



### **General Information:**

Ignitions on this unit will be different than all the other Greentree Units because of the heavy grass/forb fuel loads, proximity to neighboring stakeholders and the proximity of the ornamental trees and grape arbor to the fuels to be burned.

There are many reasons why this unit should be burned as a stubble field after mowing to reduce thatch buildup while mitigating risk. This small unit is a “box canyon” for firefighters with a high wall surrounding the N, E and S sides of the unit blocking access. The native grass fuels in this unit, perhaps due to its historic garden nature, are the heaviest grass loads on Greentree. The exposures are immediately adjacent to these fuels; the grape arbor, ornamental plantings and other educational features on display and the immediate proximity to structures and Shelter Rock Road.

The best idea is to burn this unit post mowing. The garden area is a maze of trails that create a patchwork of fuels. That is how it should be burned; post mowing, patch by patch with backing fires.

## Detailed Description and Prescription:

### Fuels and Topography

This unit is broken into distinct patches of fuels by mowed grass trails surrounded by a high brick wall on the N, E and S sides. Due to the large flame lengths for head fires predicted in these heavy fuels, ignitions will primarily be backing and flanking fires in these distinct patches. Narrow strip heads will be used to finish burning each patch once it can be assured that flame impingement or radiant heat will not impact the surrounding values at risk

### Urban Interface

This is a heavy interface unit. Immediately outside the wall is a Greentree large structure, the busy Shelter Rock Road

### Prescription Discussion and Ignition Techniques to be Employed

The nature of this burn, the concept of merely burning stubble post mowing, merits the inclusion of some Behave Plus data to understand the process and rationale.

Un-mowed the fuels in this walled garden are GS8, High Load Humid Climate grass fuels. Burning them would produce excessive flame lengths even in small patches for this tight unit with unacceptable results. Instead the fuels will be mowed and the remaining stubble/chaff is expected to behave as a Low Load, Grass and the GR2 model as seen at right was selected to predict fire behavior.

Furthermore these small patches would be burned as backing fire, not strip heads, as can be seen in the parameters selected for the Behave Plus input table above.

The Behave outputs for these patchy backing ignitions are acceptable with reasonable rates of spread and safe flame lengths in the middle areas of the prescription.

BehavePlus 5.0.5 Sun, Jan 26, 2020 at 11:02:19 Page 1

Inputs: SURFACE, IGNITE

Description: Greentree Moderate Load Stubble Fuels Unit G6

Fuel/Vegetation, Surface/Understory

Fuel Model: GR2

Fuel Moisture

1-h Moisture: 6,8,10,12,14,16

10-h Moisture: 8

100-h Moisture: 14

Live Herbaceous Moisture: 60

Live Woody Moisture: 100

Weather

Midflame Wind Speed: 1,3,5,7,9 mi/h

Direction of Wind Vector (from upslope): 180 deg

Air Temperature: 60 oF

Fuel Shading from the Sun: 0 %

Terrain

Slope Steepness: 0 %

Fire

Spread Direction (from upslope): 180 deg

BehavePlus 5.0.5 Sun, Jan 26, 2020 at 11:02:19

Greentree Moderate Load Stubble Fuels Unit G6  
Surface Rate of Spread (ch/h)

1-h Moisture %	Midflame Wind Speed mi/h				
	1	3	5	7	9
6	4.6	17.3	34.8	55.9	79.9
8	4.3	16.0	32.2	51.7	73.9
10	3.8	14.3	28.7	46.2	66.0
12	3.0	11.4	23.0	36.9	48.6
14	0.8	2.1	2.1	2.1	2.1
16	0.0	0.0	0.0	0.0	0.0

**Staffing**

For these small patches of backing fire the minimal staffing would be Burn Boss plus 2 firefighters plus the Greentree equipment.

BehavePlus 5.0.5

Sun, Jan 26, 2020 at 11:02:19

**Greentree Moderate Load Stubble Fuels Unit G6**  
Flame Length (ft)

1-h Moisture %	Midflame Wind Speed mi/h				
	1	3	5	7	9
6	1.8	3.3	4.6	5.7	6.7
8	1.7	3.1	4.3	5.4	6.3
10	1.6	2.9	3.9	4.9	5.8
12	1.3	2.4	3.3	4.0	4.6
14	0.4	0.6	0.6	0.6	0.6
16	0.0	0.0	0.0	0.0	0.0

**Prescription: Fuel Model Gr2**  
**Low Load Dry Climate Grass**

Factor	Minimum	Maximum	Comments
Season			Burn in any season, Mar/April or Sept/Oct ideal
Wind Direction	N to E to SW	N to E to SW	NE to SE winds ideal, but smoke will be mitigated by actively burning only patches of this small unit at a time.
Wind Speed Mid-flame	0	9	Note this is mid-flame windspeed, not 20'. Predicted 20' windspeed is what is shown in NWS Fire Weather Forecasts (mid-flame windspeed=0.44X20'windspeed in grass fuels)
Wind Gust Mid-flame		12	
Fine Fuel Moisture	6%	16%	FFM below 6% was constrained in prescription to prevent Probability of Ignition of flaming brands to exceed 60%
Mixing Height	1000'	No max	
Transport Winds	Any direction	Any direction	N to S transport winds ideal, but smoke will be rapidly dispersed before reaching top of mixing heights
Relative Humidity	30%	80%	
Temperature	37	100	Mid 60's ideal temp.
*Days since wetting rain	1	6	*note this is recommended not REQUIRED prescription parameter

# G7 Unit Center of Greentree (Chestnut Grove)

Unit G7 Fuel Model Gr3, Low Load, Very Course Humid Climate Grass

## **General Information:**

2.6 acres perimeter, but only 2.0 acres are in restored grasses to burn.

This unit is in the center of the Greentree property and smoke management issues are minimal.

Wide mowed grass perimeter precluding escapes except for spotting.

The primary concern is protecting the abundance of Chestnut trees (sapling height) that have been planted throughout the native grass areas within the unit, as well as scattered mature hardwood trees throughout the unit.

This unit sits at the toe of the slope rising from the grasslands of central Greentree to the summit of the forested hillside eastern half of Greentree. The unit slopes from the SE to the NW with a maximum of 6% SLOPE, however the unit itself has gently rolling terrain throughout.

Due to its small size, relatively light fuels and distance from the Greentree boundary line in all directions, this burn can be conducted with winds from any vector. It is recommended, however, that this unit not be burned on an E wind to reduce any impact of light drift smoke on the Greentree Conference Center that is located about 600' west of the burn perimeter.

(North)





## Detailed Description and Prescription:

### **Fuels and Topography**

This new Unit for the Greentree Burn Plan is 2.6 acres, but the burnable fuel acreage is actually 2 acres. The reason for this is that there are wide mowed buffers surrounding the interior area where native grasses and forbs have been planted for restoration. This unit sits at the toe of the slope rising from the grasslands of central Greentree to the summit of the forested hillside eastern half of Greentree. The unit slopes from the SE to the NW with a maximum of 6% SLOPE, however the unit itself has gently rolling terrain throughout. The unit is bounded by green grasses to the NW that are adjacent to a paved Greentree road, a hardwood timbered hedgerow to the W, a strand of hardwoods to the east and continuous hardwood forest to the S.



The fuels consist primarily of Fuel Model Gr3, Low Load Very Course Humid Climate Grass with occasional patches of Gr5 Low Load Humid Climate grass. While there places of fuel bed continuity it can generally be said the fuels are patchy throughout the unit. There are mature hardwoods and

juvenile planted Chestnut trees in the throughout the interior

(emergent from the grasses) that will require either pre-treatment or careful



burnout/holding with backpack pumps during ignition. The unit is surrounded by mowed fuel breaks, and there are cinder surfaced trails that run through the unit.

### **Urban Interface**

Other than the Greentree Conference Center located about 600 feet west of the unit, there are no public or infrastructure issues. The Greentree boundary is 0.3 to the W of the unit and 0.5 miles from the unit in all other directions.

**Prescription Discussion and Ignition Techniques to be Employed**

The prescription table (below) contains parameters that minimize smoke production, restrict burning unless good atmospheric ventilation is present

The winds can be from any direction for this burn, however as noted above it is recommended to avoid an E wind to minimize any smoke impacts to the Greentree Conference Center.

Ignitions would commence from the downwind side along the mowed fuel breaks or cindered foot trails to establish an anchor point. Most of the interior ignition will be spot ignitions to take advantage of concentrated patches of fuels, to take advantage of rolling topography within the interior of the unit and to protect both mature hardwoods and juvenile planted Chestnuts scattered throughout the unit. Most protection of these trees will be achieved by coupling ignition resources along with firefighters with flappers and backpack pumps.

**Staffing**

The Greentree Burn Plan requires Burn Boss plus 2 trained wildland firefighters and the Greentree staff and equipment as minimum staffing, but for this burn we boost the trained wildland firefighters to 6 in addition to Burn Boss and Greentree staff and equipment due to interior spot ignitions and protecting trees inside the unit.

**Prescription: Unit G7 Fuel Model Gr3, Low Load, Very Course Humid Climate Grass**

<b>Factor</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Comments</b>
Season			Burn in any season, Mar/April or Sept/Oct ideal
Wind Direction	Any	Any	Avoid E wind
Wind Speed Mid-flame	0	9	Note this is mid-flame windspeed, not 20'. Predicted 20' windspeed is what is shown in NWS Fire Weather Forecasts (mid-flame windspeed=0.44X20'windspeed in grass fuels)
Wind Gust Mid-flame		12	
Fine Fuel Moisture	6%	16%	FFM below 6% was constrained in prescription to prevent Probability of Ignition of flaming brands to exceed 60%
Mixing Height	1000'	No max	
Transport Winds	Any direction	Any direction	
Relative Humidity	30%	80%	
Temperature	37	100	Mid 60's ideal temp.
*Days since wetting rain	1	8	*note this is recommended not REQUIRED prescription parameter

**For predictive info on Rate of Spread, Head Flame Length and Probability of Ignition please refer to the Behave Plus data at the end of this Appendix, Fuels GR3. Bear in mind that ignition techniques using narrow strip heads will not allow for full development of head fire flame lengths.**

# Unit G9 Tower Unit

## Fuel Model Gr6, Moderate Load Humid Climate Grass



### General Information:

This unit is in the SE corner of the Greentree property. It abuts the Deepdale Golf Club immediately to the South and the Northwell Hospital to the west. It is a relatively oval shaped unit, running east to west. The west and east sides are the highest ground of the unit with a swale running from south to north through the middle. Outside the NW corner of the unit in the adjacent forest is a Chestnut tree plantation that would need to be protected in event of a spot fire into the forest in that location. There is a Greentree house about 100 yards from the SW corner of the unit.

This unit had a wildfire in April 2014 which burned the north and east portion of the unit and extended slightly into the hardwoods to the north and into Grass Unit 8 to the NE.

This unit was successfully burned on April 13, 2017 by Risky Business Incident Management LLC on a NNW wind. Staffing was Burn Boss plus 6 firefighters plus the Greentree staff and equipment. The wind was NNW and the prescription had been modified to include that vector several days before the burn. The burn commenced with establishment of anchor and Test Fire in the SE corner of the unit using backing fire and narrow strip heads. The S half of the unit was burned first using narrow strip heads, followed by the N half. The burn took about 4 hours. A smoke monitor was posted at the Deepdale Country Club parking area and also patrolled along 1495 from interchange 33 to 35. No smoke sheen was detected at these locations, and the monitor reported only the smell of smoke in the air. No complaints were received other than 1 ex-officer (no longer on the department) of the Manhasset Lakeview FD who called Greentree when he smelled smoke, but had not bothered to call the fire department dispatch who was well aware of the permitted burn.

## Detailed Description and Prescription:

### Fuels and Topography

This unit is relatively oval in shape with a swale in the middle running from south to north. The highest ground is in the west. Slopes run about 10% in the middle of the unit. The fuels are a relatively continuous Gr6 Moderate Load Humid Climate Grass.

### Urban Interface

Wind vectors of this prescription (W to S to SSE) are critical to successful smoke management. The hospital to the west, major traffic corridor of Community Drive to the west, Long Island Expressway to the south and other surrounding infrastructure to south and west are concerns to be mitigated. To the south of the unit is Deepdale Golf Course, and a fairway and green about the unit on the south. The 800 bed Class I Trauma Center with helispot is 300 yards to the West of this unit. To the immediate WNW on of the unit Greentree lands is a Chestnut tree plantation that is also a value at risk in case of escaped fire to the west.

It must be noted that narrow strip head ignitions and the in-prescription wind vector on April 13, 2017 allowed this burn to be conducted with no smoke impacts to any of this urban interface.

### Prescription Discussion and Ignition Techniques to be Employed

On the prescribed winds the ignition of this unit is straightforward with ignition backing fire to anchor the burn and ignition of a Test Burn with narrow strip heads into that anchored zone all on the downwind edge. Continue firing would then carry backing/flanking fires up the flank then filling in between these flanks with narrow /



increasing width strip heads. Once the fire is well anchored, strip head width is constrained only by desired level of smoke generated.

**Staffing**

It is recommended that this larger unit be staffed with Burn Boss plus 6 firefighters, plus the support of Greentree staff with 1 T7 engine, 1 UTV with sprayer and a dedicated smoke monitor.

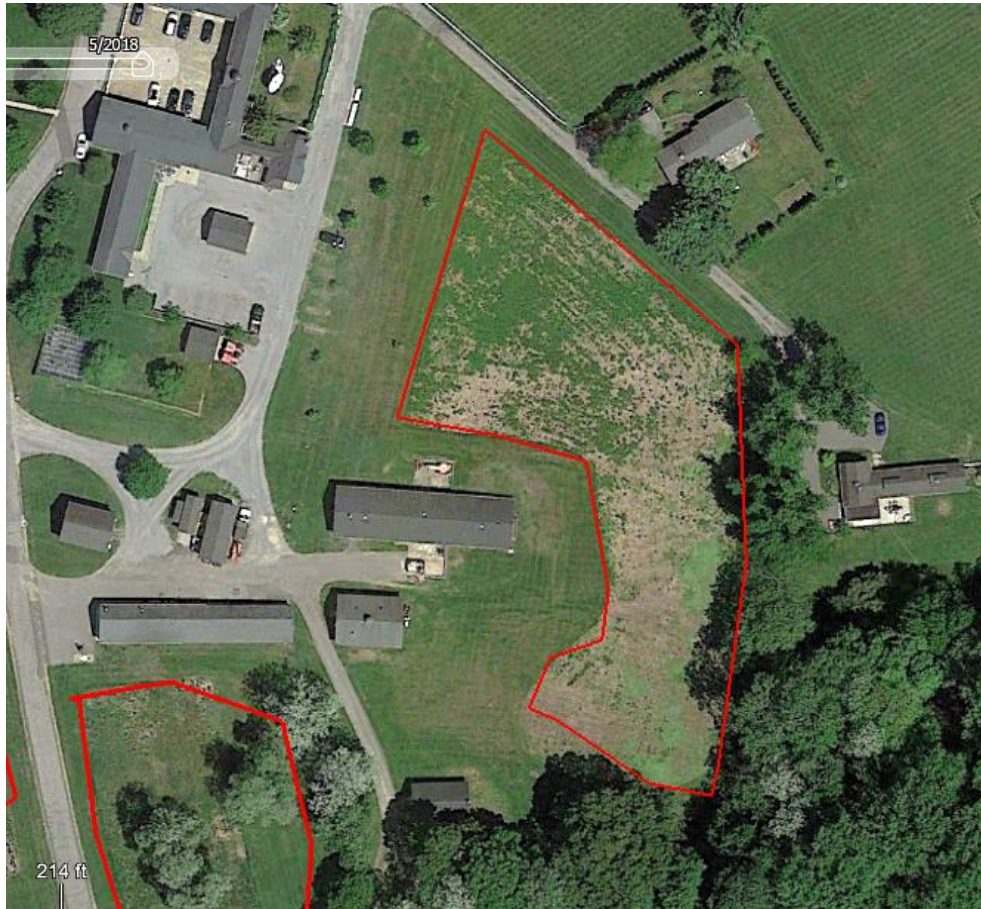
**Prescription: Fuel Model Gr6, Moderate Load, Humid Climate Grass**

Factor	Minimum	Maximum	Comments
Season			Burn in any season, Mar/April or Sept/Oct ideal
Wind Direction	NNW to S to SE	NNW to S to SE	W to SW winds ideal. The biggest smoke constraint here is huge! The Northwell Hospital is an enormous complex that begins only about 300 yards due West of this burn unit.
Wind Speed Mid-flame	0	9	Note this is mid-flame windspeed, not 20'. Predicted 20' windspeed is what is shown in NWS Fire Weather Forecasts (mid-flame windspeed=0.44X20'windspeed in grass fuels)
Wind Gust Mid-flame		12	
Fine Fuel Moisture	6%	16%	FFM below 6% was constrained in prescription to prevent Probability of Ignition of flaming brands to exceed 60%
Mixing Height	1000'	No max	
Transport Winds	NNW to S to SE	NNW to S to SE	W to S to SSE transport winds are needed to insure that smoke cannot impact the Hospital.
Relative Humidity	30%	80%	
Temperature	37	100	Mid 60's ideal temp.
*Days since wetting rain	1	6	*note this is recommended not REQUIRED prescription parameter

**For predictive info on Rate of Spread, Head Flame Length and Probability of Ignition please refer to the Behave Plus data at the end of this Appendix, Fuels GR6. Bear in mind that ignition techniques using narrow strip heads will not allow for full development of head fire flame lengths.**

# Unit T5

Gr3, Low Load Very Coarse Humid Climate Grass, Gr5 Low Load Humid Climate grass.



## **General Information:**

This new unit for the Greentree Burn Plan is 1.1 acre. In 2017 this flat previous pasture area was plowed and drill seeded with native grasses and forbs. These grass fuels have good continuity as the planting was successful. Adjacent fuels are mostly old fields of pasture grass, but the SE corner of the unit is against a hardwood forest, albeit separated by a mowed fire break.

## Detailed Description and Prescription:

### **Fuels and Topography**

This flat unit consists of Fuel Model Gr3, Low Load, Very Coarse Humid Climate Grass (30%) Gr5, Low Load, Humid Climate Grass (70%).

### **Urban Interface**

The Greentree main office infrastructure and a Greentree staff residence are immediately adjacent to this unit. Community Drive is 300 yards to the West. Northwell Hospital is 300 yards South / Southwest.



### **Prescription Discussion and Ignition Techniques to be Employed**

The ideal wind vectors of this prescription (NW to SE) would allow for the widest range of ignition options

Instead with any wind vector this unit can be ignited using strip heads in a manner that will reduce smoke impacts outside of the Greentree Foundation property. Once again the burn will be started with downwind backing fire anchor zone, then followed by a Test Fire of narrow strip heads. Firing would then process up the flanks against the wind with narrow strip heads filling in between.

### **Staffing**

Burn Boss plus 2 firefighters with the Greentree staff in addition. A dedicated smoke monitor will be assigned to patrol and document smoke conditions along Shelter Rock Road and developed areas adjacent to Greentree.

**For predictive info on Rate of Spread, Head Flame Length and Probability of Ignition please refer to the Behave Plus data at the end of this Appendix, Fuels GR3 and GR5. Bear in mind that ignition techniques using narrow strip heads will not allow for full development of head fire flame lengths.**

**Prescription: Fuel Model Gr3, Low Load & Gr5 Low Load Grasses**

<b>Factor</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Comments</b>
Season			Burn in any season, Mar/April or Sept/Oct ideal
Wind Direction	Any Direction	Any Direction	NW to SE winds ideal. With NW to SE winds smoke will not be an issue outside of Greentree Foundation property. If winds are from other vectors narrow strip head ignitions will be required to mitigate smoke impacts outside of Greentree Foundation property.
Wind Speed Mid-flame	0	9	Note this is mid-flame windspeed, not 20'. Predicted 20' windspeed is what is shown in NWS Fire Weather Forecasts (mid-flame windspeed=0.44X20'windspeed in grass fuels)
Wind Gust Mid-flame		12	
Fine Fuel Moisture	6%	16%	FFM below 6% was constrained in prescription to prevent Probability of Ignition of flaming brands to exceed 60%
Mixing Height	1000'	No max	
Transport Winds	Any direction	Any direction	W to N to ESE transport winds ideal, but smoke will be rapidly dispersed before reaching top of mixing heights
Relative Humidity	30%	80%	
Temperature	37	100	Mid 60's ideal temp.
*Days since wetting rain	1	6	*note this is recommended not REQUIRED prescription parameter

Following pages contain Behave Plus outputs for all these fuel types.

Appendix II Specific Prescriptions for Individual Burn Units



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Inputs: SURFACE, IGNITE

Description

Fuel/Vegetation, Surface/Understory

Fuel Model

Fuel Moisture

1-h Moisture %

10-h Moisture %

100-h Moisture %

Live Herbaceous Moisture %

Live Woody Moisture %

Weather

Midflame Wind Speed (upslope) mi/h

Air Temperature oF

Fuel Shading from the Sun %

Terrain

Slope Steepness %

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Greentree Low Course Fuels Units G1.G3.G7,T5

Surface Rate of Spread (maximum) (ch/h)

1-h Moisture %	Midflame Wind Speed (upslope) mi/h				
	1	3	5	7	9
6	8.3	26.5	47.7	70.8	95.3
8	7.6	24.3	43.8	64.9	87.4
10	7.1	22.7	40.9	60.6	81.6
12	6.7	21.5	38.7	57.4	77.2
14	6.4	20.5	36.8	54.7	73.6
16	6.1	19.5	35.1	52.1	70.2

Greentree Low Course Fuels Units G1.G3.G7,T5

Flame Length (ft)

1-h Moisture %	Midflame Wind Speed (upslope) mi/h				
	1	3	5	7	9
6	3.1	5.2	6.9	8.2	9.4
8	2.9	4.9	6.4	7.7	8.8
10	2.7	4.7	6.1	7.3	8.4
12	2.6	4.5	5.9	7.1	8.1
14	2.5	4.4	5.7	6.8	7.8
16	2.5	4.2	5.5	6.6	7.6

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Greentree Low Load Fuels Units G1, G3, G7, T5)

Probability of Ignition from a Firebrand (%)

1-h Moisture %	Midflame Wind Speed (upslope) mi/h				
	1	3	5	7	9
6	53	53	53	53	53
8	39	39	39	39	39
10	29	29	29	29	29
12	21	21	21	21	21
14	15	15	15	15	15
16	11	11	11	11	11

Appendix II Specific Prescriptions for Individual Burn Units

**Inputs: SURFACE, IGNITE**

Description Greentree Low Load Humid Fuels Units G2.G5.G7.T5

**Fuel/Vegetation, Surface/Understory**

Fuel Model GR5

**Fuel Moisture**

1-h Moisture % 6,8,10,12,14,16

10-h Moisture % 8

100-h Moisture % 14

Live Herbaceous Moisture % 60

Live Woody Moisture % 100

**Weather**

Midflame Wind Speed (upslope) mi/h 1,3,5,7,9

Air Temperature oF 60

Fuel Shading from the Sun % 0

**Terrain**

Slope Steepness % 5

Greentree Low Load Humid Fuels Units G2.G5.G7.T5  
Surface Rate of Spread (maximum) (ch/h)

1-h Moisture %	Midflame Wind Speed (upslope) mi/h				
	1	3	5	7	9
6	9.0	30.2	57.9	90.2	126.0
8	8.2	27.6	52.9	82.3	115.0
10	7.6	25.5	48.9	76.0	106.3
12	7.1	23.9	45.7	71.1	99.4
14	6.7	22.5	43.2	67.2	93.9
16	6.4	21.4	41.1	63.9	89.4

Greentree Low Load Humid Fuels Units G2.G5.G7.T5  
Flame Length (ft)

1-h Moisture %	Midflame Wind Speed (upslope) mi/h				
	1	3	5	7	9
6	4.6	8.0	10.8	13.3	15.5
8	4.3	7.5	10.1	12.4	14.4
10	4.1	7.1	9.5	11.7	13.6
12	3.9	6.7	9.1	11.1	13.0
14	3.7	6.5	8.7	10.7	12.5
16	3.6	6.3	8.5	10.4	12.1

Greentree Low Load Humid Fuels Units G2.G5.G7.T5  
Probability of Ignition from a Firebrand (%)

1-h Moisture %	Midflame Wind Speed (upslope) mi/h				
	1	3	5	7	9
6	53	53	53	53	53
8	39	39	39	39	39
10	29	29	29	29	29
12	21	21	21	21	21
14	15	15	15	15	15
16	11	11	11	11	11

## Appendix II Specific Prescriptions for Individual Burn Units

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**Inputs: SURFACE, IGNITE**

Description

**Fuel/Vegetation, Surface/Understory**

Fuel Model

**Fuel Moisture**

1-h Moisture %

10-h Moisture %

100-h Moisture %

Live Herbaceous Moisture %

Live Woody Moisture %

**Weather**

Midflame Wind Speed (upslope) mi/h

Air Temperature oF

Fuel Shading from the Sun %

**Terrain**

Slope Steepness %

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### Greentree Moderate Load Fuels Units G2,G3,G4,G5,G9 Flame Length (ft)

1-h Moisture %	Midflame Wind Speed (upslope) mi/h				
	1	3	5	7	9
6	5.3	9.5	13.2	16.6	19.7
8	5.0	8.9	12.3	15.5	18.4
10	4.7	8.4	11.7	14.6	17.4
12	4.5	8.0	11.1	14.0	16.6
14	4.3	7.7	10.7	13.5	16.0
16	4.2	7.5	10.4	13.0	15.5

### Greentree Moderate Load Fuels Units G2,G3,G4,G5,G9 Surface Rate of Spread (maximum) (ch/h)

1-h Moisture %	Midflame Wind Speed (upslope) mi/h				
	1	3	5	7	9
6	9.9	35.3	72.3	118.3	172.0
8	9.1	32.3	66.3	108.4	157.7
10	8.4	30.0	61.5	100.6	146.3
12	7.9	28.1	57.7	94.4	137.2
14	7.5	26.6	54.6	89.3	129.8
16	7.1	25.4	52.0	85.1	123.8

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### Greentree Moderate Load Fuels Units G2,G3,G4,G5,G9 Probability of Ignition from a Firebrand (%)

1-h Moisture %	Midflame Wind Speed (upslope) mi/h				
	1	3	5	7	9
6	53	53	53	53	53
8	39	39	39	39	39
10	29	29	29	29	29
12	21	21	21	21	21
14	15	15	15	15	15
16	11	11	11	11	11

Appendix II Specific Prescriptions for Individual Burn Units

Inputs: SURFACE, IGNITE

Description Greentree High Load Humid Fuels Unit G6

Fuel/Vegetation, Surface/Understory

Fuel Model GR8

Fuel Moisture

1-h Moisture % 6,8,10,12,14,16

10-h Moisture % 8

100-h Moisture % 14

Live Herbaceous Moisture % 60

Live Woody Moisture % 100

Weather

Midflame Wind Speed (upslope) mi/h 1,3,5,7,9

Air Temperature oF 60

Fuel Shading from the Sun % 0

Terrain

Slope Steepness % 0

Greentree High Load Humid Fuels Unit G6  
Surface Rate of Spread (maximum) (ch/h)

1-h Moisture %	Midflame Wind Speed (upslope) mi/h				
	1	3	5	7	9
6	18.8	58.0	103.8	153.7	206.8
8	17.3	53.2	95.1	140.8	189.5
10	16.1	49.6	88.6	131.3	176.7
12	15.2	46.8	83.8	124.1	166.9
14	14.5	44.6	79.7	118.1	158.9
16	13.8	42.5	75.9	112.4	151.3

Greentree High Load Humid Fuels Unit G6  
Flame Length (ft)

1-h Moisture %	Midflame Wind Speed (upslope) mi/h				
	1	3	5	7	9
6	10.5	17.7	23.1	27.6	31.7
8	9.8	16.5	21.6	25.9	29.6
10	9.4	15.7	20.5	24.6	28.2
12	9.0	15.1	19.7	23.6	27.1
14	8.7	14.6	19.1	22.9	26.2
16	8.4	14.1	18.5	22.1	25.4

Greentree High Load Humid Fuels Unit G6  
Probability of Ignition from a Firebrand (%)

1-h Moisture %	Midflame Wind Speed (upslope) mi/h				
	1	3	5	7	9
6	53	53	53	53	53
8	39	39	39	39	39
10	29	29	29	29	29
12	21	21	21	21	21
14	15	15	15	15	15
16	11	11	11	11	11