Mount Tabor Meadows Common Space Conceptual Master Plan

Blacksburg, Virginia

Prepared for Mount Tabor Meadows Home Owners Association
August 2010
The Community Design Assistance Center (CDAC) is an outreach center for the College of Architecture and Urban Studies and Virginia Tech that assists communities, neighborhood groups and non-profit organizations in improving the natural and built environment, through design, planning and research. Through the integration of the learning and working environment, the Center will execute projects that link instruction and research and share its knowledge base with the general public.

**CDAC Project Team Members:**

Elizabeth Gilboy, Director

Kim Steika, Landscape Architecture Project Coordinator

Kaitlyn Illmensee, Undergraduate Student, Landscape Architecture

Ashleigh Marshall, Undergraduate Student, Landscape Architecture

William West, Graduate Student, Urban Forestry

**Community Design Assistance Center**

101 South Main Street. Blacksburg, VA 24061

p. 540.231.5644     f. 540.231.6089

http://cdac.arch.vt.edu
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John Boyer, Assistant Director, Public Works, Field Operations, Town of Blacksburg

Justin Boyle, Green Valley Builders

Susan Day, Forest Resources & Environmental Conservation, Department of Forestry, Assistant Professor Virginia Tech

Jerry Ford, Mount Tabor Meadows Community Member

James Higgins, Water Resource Inspector, Town of Blacksburg

Lee Hixon, Stormwater Engineer, Town of Blacksburg

Beth Lohman, Mount Tabor Meadows Community Member

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Introduction

The Community Design Assistance Center (CDAC) worked with the Mount Tabor Meadows (MTM) community to develop a conceptual master plan of their vision for a new and sustainable use for the community’s underutilized common space.

Mount Tabor Meadows is a neighborhood located in Blacksburg, Virginia developed by Green Valley Builders. All of the homes are EarthCraft certified and Energy Star Rated. In the heart of the development, a community open space – MTM Commons – has been preserved. Currently, the Commons is an open field mowed seasonally for hay, and in part serves as a stormwater basin. After months of consideration, the homeowners developed a list of desired uses for the space, including a playground, community shelter/gathering space, a spot for community gardens, and an urban forest to increase opportunities for stormwater infiltration and carbon sequestration on site.

In March of 2010, MTM began working with the CDAC to develop conceptual plans for the common space. In conjunction with the community’s sustainable mission, it was the desire of the home owners association to develop a plan for their new common space that was not only a place for recreation and community development, but also provided a service to the natural systems of the site. All of the listed ideas carry the community members’ aims of sustainability and stewardship into the Commons.
**Design Process**

MTM community members held a series of brainstorming meetings prior to contacting CDAC to help with the project. During these meetings, the community members developed a list of desired amenities and functions they would like to see incorporated into the Commons.

An initial site visit was conducted by the CDAC team in mid March, with Justin Boyle, resident and Green Valley Builders co-owner and Jerry Ford, MTM resident. The team walked the site and discussed site conditions, ideas for placement of proposed amenities and the overall vision for the space.

After collecting base map information and developing a set of site inventory and analysis maps, the CDAC team prepared four preliminary concept diagrams that examined various options for stormwater management and site layout for the Commons. The analysis and concepts were presented at an HOA meeting in April 2010, where residents provided feedback and chose two concept options to be further developed.

CDAC incorporated the feedback received from the community members and developed two refined conceptual master plans. While developing these plans, the CDAC team assisted MTM in an online grant contest hosted by Kaboom.org called the Promote Your Project Design Contest, in which the Grand Prize was a $5000 grant toward playground equipment. The Kaboom contest was not only a way for the community to raise money for the project but also served as an excellent tool for communication between residents and raised awareness in the surrounding communities about MTM’s overall vision.

The two revised conceptual master plans were presented at a later meeting where residents gave additional comments.
towards the ideas they would like to see on the final plan.

The CDAC team also sought feedback from Blacksburg Town staff Lee Hixon, James Higgins, and John Boyer and Virginia Tech Professor Susan Day regarding ideas for planting and stormwater management. Comments from community members and Town and Virginia Tech consultants were incorporated into the final design for the Commons. The final plan was presented at the MTM HOA meeting held in June 2010.
Inventory and Analysis

Through the site inventory and analysis the CDAC team was able to identify opportunities and constraints on the site as well as analyze the site conditions based on some specific requests made by the community. See the Site Inventory and Analysis Maps on the following pages for more information.

Hydrology and Vegetation

The primary goal of this project was to create a more efficient stormwater basin that also functions for recreation. It was necessary to understand the topography and direction of water flow on the site in order to retrofit the basin. In addition there are some existing trees on site that will remain, which are represented by green circles on the map on the following map.

Underground Utilities

The underground utilities created parameters that the CDAC team had to work within. First, the storm drains and their outfalls were identified (denoted with blue dashed lines). The community expressed an interest in planting a large amount of trees in the space and mature root systems can be detrimental to underground pipes. A small network of sanitary sewer and storm drains intersect the site. The CDAC team was advised that a 15 foot easement is required around all underground utilities. Existing utilities and their easements are shown with a smaller dashed line and the areas acceptable for planting are highlighted.

Soils

The Mount Tabor Meadows soil quality is optimal for the creation of the common space urban forest, playground, and dry creek bed. A suitable soil compaction reading is anywhere under 200; however under 100, which is where our soils rank, is ideal. The compaction rating breakdown as follows: <100 = little to no compaction, 100-200 = moderate compaction, 200-300 = severe compaction. Based on the prior use of the site, one may assume there are likely no dangerous soil contaminants.

Critical Connections

It was important to study access points for the space as well as pedestrian flow through the site. The only place for public entry to the Commons is located at the corners of Mount Tabor Road and Petra Pass. The CDAC team was aware that pedestrians from the eastern side of the development will probably not walk all the way around to the public access; rather they will make their own entrances through other properties. The purple arrows denote potential access zones. The eastern-most zone is the best place to create an entrance easement since the lot is currently not owned by an individual homeowner.

View Sheds

It was expressed by some residents, whose homes do not have a direct view to the Commons, that creating focal points in the space that were visible from their properties were desired. CDAC studied the views from homes on the back lots and were able to determine the best placement for a point of interest based on the largest amount of overlap.

Existing Barn

The community decided that they wanted to tear down the existing barn structure, so the barn was not included in any design concepts.
Mount Tabor Meadows Common Space Plan

Hydrology & Vegetation

Mount Tabor Meadows Commons
Blacksburg Virginia

Initial base map information provided by Altizer, Hodges, & Varney, Inc.

This drawing is conceptual and was prepared to show approximate locations with regard to topography of the feature. The subject to change and is not intended to replace the use of construction documents. The client should consult appropriate professionals before any construction or site work is undertaken. The Community Design Assistance Center is not responsible for the inaccurate use of this drawing.
Mount Tabor Meadows Common Space Plan

ANALYSIS

Underground Utilities

Mount Tabor Meadows Commons
Blacksburg Virginia

NORTH

NOT TO SCALE

Stormwater
Sanitary Sewer
Acceptable Planting Zones
Stormdrain Inlet/Outlet

Zones Acceptable for Tree Planting

This drawing is conceptual and was prepared to show approximate locations and arrangement of the features. It is subject to change and may not reflect the actual use of coordinates or the extent of construction or site work to be undertaken. The Community Design Assistance Center is not responsible for inappropriate use of this drawing.

Initial base map information provided by Altizer, Hodges, & Varney, Inc.
Vision

The MTM community members held many meetings prior to enlisting the services of CDAC, in which they developed a series of criteria and visions for the common space. Four key goals for the space were agreed upon and are as follows:

**Increase Stormwater Efficiency**
A large portion of the site is an existing stormwater basin. The community would like to retrofit the basin in a way that would increase infiltration and decrease stormwater flows.

**Create an Urban Forest**
As a method for reducing runoff the community would also like to see an urban forest within the space. Native species will be used to mimic the zones of a natural forest, from the upland forest to the lower creek and river species.

**Site a Playground**
The playground will be a place for the neighborhood children to play and socialize. A pre-fabricated play structure is desired, but it is also necessary that the entire Common Space be a place that is friendly for outdoor recreation, exploration, and education.

**Include Other Amenities**
The community expressed an interest in having a covered structure to host community events and gatherings. They would also like a space designated for potential community garden spots. Community members also expressed a desire to create habitat opportunities for the barn swallows that currently nest in the old barn on site.
Stormwater: Existing Conditions and Options

Currently the design of the basin allows water to flow in an open channel through the Commons, as seen by the photos of the pipes and grass swale below. In order to increase infiltration the CDAC team proposed a dry creek bed channel which will not only slow down water flow with stone weirs, but will also increase ponding time to provide greater amounts of groundwater infiltration. A series of large and small weirs will maximize efficiency and reduce overflow, as well as create a dynamic landscape for exploration. The photos to the right depict the aesthetic of the dry creek bed.

existing stormwater outfall pipe.

existing grass swale.

existing outfall pipes and overflow drain (far right).

Dry Creek Bed

Photo from: http://www.leaflandscape.com

Dry Creek Bed with Foot Bridge

Photo from: http://www.aila.org.au/canberragarden

Dry Creek Bed with Riparian Plantings

Photo from: http://www.blockandstone.com
Urban Forest: Plant Palette

The community hopes to create an urban forest that will provide many environmental services: stormwater management through, increased infiltration and on-site storage; shade and cooling effects; wildlife habitat; and edible foods. The idea is to mimic a Virginia Appalachian forest by using native species that would naturally occur in low areas and along water sources and transition up to an upland forest of large Oak and Beech trees. This is an opportunity to provide a beautiful, educational, and unique landscape in the commons. Some selected trees include American Beech, for its shade and tree climbing qualities and Black Willow for its high levels of root uptake. Service Tree, Paw Paw Tree, and Persimmon are not only native but provide edible fruit for people and wildlife, and Witch Hazel has wonderful winter color. Other potential species include the Red Oak, Tulip Poplar, and Flowering Dogwood.
Playground: Familiar and Imaginative

Within the Commons, the community would like to have a play structure that provides a place for the neighborhood children to play and exercise their minds and bodies. While they envision a portion of the playground being a prefabricated structure, they would also like to encourage exploration into the other components of the natural space. “We want to see an integrated play space that provides transitions between the natural landscape we are creating, and the physical playground. We have chosen a structure that continues with this natural aesthetic, and plan to construct additional features (i.e. natural tunnel) to weave the hardscape into the overall landscape” (Beth Lohman, MTM resident). Below are examples of the types of character desired by MTM for play equipment.
**Amenities: Structure and Gardens**

Additional site amenities such as a community shelter and community gardens are desired by MTM. The shelter would serve as a place for picnics and other community events and the gardens would be a place for residents to grow and share the joy of growing one’s own vegetables with neighbors.
Conceptual Layout

After conducting the initial site analysis and brainstorming concept ideas, the CDAC team developed a series of conceptual diagrams to illustrate various potential site layouts and stormwater approaches for the site. Each conceptual diagram designates a space for the playground, community space, and walking trail. Aspects of the diagrams are interchangeable and were intended to serve as a talking point for the community meeting.

**Concept A: Bioretention Terraces**
The bioretention terraces would be a series of stone walls, with overflow weirs designed to create pools of water to allow for maximum water infiltration. Any water beyond capacity would simply flow through the weirs and out of the basin as it is currently doing. The areas of green on the 11x17 pullout on page 17 represent the location urban forest component of the vision, avoiding the underground utilities easements.

**Concept B: Dry Creek Bed**
The dry creek bed is an enhancement of the current grass swale on the site. By creating a longer and more curvaceous channel, the water will have more time to absorb into the earth. The creek bed would be planted with plants specified for bioretention, meaning they have a high tolerance to drought and inundation and have the ability to absorb large amounts of water. This concept also suggests creating a rain garden at the community shelter to serve as a demonstration for collecting roof runoff. The rain garden would also be a starting point for the meandering creek bed. There is also a space designated on the upper western portion of the site for community gardens.
Conceptual Layout: cont

**Concept C: Level Spreader**
The level spreader works similarly to the bioretention terraces, only it would be installed in a much more naturalized form. This concept also suggests placing the community gardens in the small space on the southwestern edge of the site. This area has a slight slope that could be a great place for terraced planting beds. One drawback would be having the gardens adjacent to the main entry, as they have a more informal aesthetically, especially in the non-growing season.

**Concept D: Creek Bed with Check Dams**
This version of the dry creek bed looks at adding several meandering branches to the main swale and also a series of small check dams. The check dams would be a mound of stone placed in the bed perpendicular to the swale, and at the sizing specifications of the Virginia Department of Conservation and Recreation. The check dams serve as a way of slowing down the flow of water. In a large storm event they would be highly effective in increasing infiltration. In Concept D, the community space and the gardens are integrated with each other.

**Outcome:**
The CDAC team received valuable comments and feedback from community members in April related to the analysis and initial concepts. This feedback was used to help in create two refined conceptual alternatives. The community agreed that the dry creek bed concept was their favorite stormwater concept and that they would like to see the playground and community space integrated, with the community gardens being a separate entity.

11x17 pullouts of the four conceptual diagrams can be found on the following pages.
Mount Tabor Meadows Common Space Plan

CONCEPTS

Concept A

Bioretention Terraces

Mount Tabor Meadows Commons

Blacksburg, Virginia

NORTH

NOT TO SCALE

Playground

existing sidewalk

Community Space

Urban Forest

Urban Forest

Urban Forest

Bioretention Terraces

Walking Trail

Future Bike Trail Connection

PETRA PASS

ASHER LANE

MASADA WAY

MOUNT TABOR ROAD

Initial base map information provided by Altizer, Hodges, & Varney, Inc.

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Mount Tabor Meadows Common Space Plan
Mount Tabor Meadows Commons

Concept B

Dry Creek Bed

Mount Tabor, Blacksburg, Virginia

Urban Forest
Community Space
Play Area
Existing Sidewalk
Walking Trail
Conceptual Stormwater Treatment

Initial base map information provided by Altizer, Hodges, & Varney, Inc.
Mount Tabor Meadows Common Space Plan

CONCEPT

Mount Tabor Meadows Commons
Blacksburg, Virginia

NOT TO SCALE

Urban Forest
Community Space
Play Area
Existing Sidewalk
Walking Trail
Conceptual Stormwater Treatment

Future Bike Trail Connection
Potential access point
Potential access points
Community Garden

Initial base map information provided by Altizer, Hodges, & Varney, Inc.
Mount Tabor Meadows Common Space Plan

CONCEPTS

Concept D

Creek Bed with Check Dams

Mount Tabor Meadows Commons
Blacksburg Virginia

NORTH

NOT TO SCALE

Urban Forest
Community Space
Play Area
Potential access point

Future Bike Trail Connection

Meandering Dry Creek Bed
Community Garden
Community Space w/ Rain Garden

Initial base map information provided by Altizer, Hodges, & Varney, Inc.
Conceptual Development

The CDAC team developed two conceptual master plans exploring specific components and their layout on the site.

Conceptual Master Plan A

In this version of the Commons, a single channel creek bed is proposed, beginning with a rain garden at the eastern-most corner of the site, and meandering through the site to end at a large rain garden on the lowest point of the site. The community gardens are located on a flat high point near the current model home. The community shelter is located centrally on the site with the playground adjacent to it on a flat high point as well. Climbing boulders and the natural tunnel are located in the open space around the shelter to create a transition of the playground into the other portions of the site and to further integrate the two spaces. In an effort to make the playground a place that is also adult friendly, an arbor designed to hold porch swings is proposed to provide adults with a place to sit while children are playing. The tree plantings in this concept are less dense, allowing for more native grasses and open space.

Conceptual Master Plan B

Conceptual Master Plan B proposes a creek bed with two channels and areas for ponding created with stone weirs, as were proposed in Layout D. The community gardens are located in the same place as Plan A. The shelter is located adjacent to the rain garden at the beginning of the creek bed to allow for collecting the roof runoff in the rain garden. This could serve as demonstration for rain garden application for homeowners in the community. The playground is located in the same area, as it is the most suitable location, but the natural transition play features are distributed over a larger area in hopes of encouraging exploration of the creek bed and urban forest corridor. A trail with small foot bridges helps to encourage this as well.

11x17 pullouts of Conceptual Master Plans A & B can be found on the following pages.
Mount Tabor Meadows, Blacksburg Virginia
Conceptual Master Plan A

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Final Conceptual Master Plan

The Final Conceptual Master Plan is the culmination of design ideas and feedback from the community and Blacksburg Town Staff. Feedback and comments from community members helped to determine the location of various amenities, in addition to some constraints determined in the analysis phase of the project.

The master plan contains all the amenities that the community requested including a urban forest, community gathering area, walking loop, playground, and community garden space. Native plants offer seasonal value and edible landscape opportunities. The braided dry creek bed offers additional opportunities for stormwater storage and management and also creates visual interest in the space. Proposed barn swallow houses fit nicely in the natural environment. Educational signage highlights the best management practices and describes the zones of an Appalachian forest mimicked in the Commons.

An 11x17 pullout of the Final Conceptual Master Plan can be found on the next page with a number key locating and describing each item on the plan. Supporting sketches can be found on page 26.
Playground

The Tree House (Landscape Structures Inc., a partner of Kaboom) is an example of a pre-fabricated structure that could be purchased for the site. The design of this structure works with the natural theme of the play space. Surrounding the playground is a porch swing/arbor design that will serve as place of relaxation and conversation for adults and children. An small grove of American Beech and Red Oak trees surround the common space and act as a screen for adjacent homes. The Beech tree sited near the playground because of its branching structure - to provide future climbing opportunities for neighborhood children.

Natural Tunnel

Sketch B depicts some of the more natural play options in the community space. The tunnel is an inexpensive play feature that encourages creative play, different from the traditional playground. The structure could be constructed out of corrugated plastic pipe and covered with existing dirt and turf to create a tunnel and land bridge feature. The proposed boulders create additional spaces to climb throughout the play space and can be constructed using rocks found on site.

Creek Bed

The dry creek bed provides an both aesthetic and environmentally beneficial feature in the common space. The addition of check dams and ponding areas along the creek bed will allow for increased infiltration and reduced stormwater flow speed. Dense plantings of wildflowers, native grasses, and small shrubs will help slow water, reduce erosion, and uptake water through the plants.

Pathway

Stretching just over a ¼ mile through the site is a permeable crushed stone pathway that provides an exercise opportunity as well as a stage to experience the common space. Walking along the trail, users can learn about the stormwater management, the urban forest, creek bed vegetation, and wildlife. Three wooden foot bridges are found along the pathway providing access over the creek beds while allowing users to engage in the natural system.
Planting Options

In order to achieve the desired urban forest, plant selection was very important in the design process. The CDAC team selected plants that will not only be beneficial to the landscape in terms of shade, cooling, and root uptake, but also for creating a native and beautiful natural forest landscape. The proposed planting plant for MTM can be found on page 29. The subsequent pages highlight the suggested species and some of their characteristics.
Mount Tabor Meadows Conceptual Planting Plan

Creek Bed Plants:
- Black Willow (Salix nigra)
- American Beech (Fagus grandifolia)
- Tulip Poplar (Liriodendron tulipifera)
- Red Oak (Quercus rubra)
- Yellow Birch (Betula alleghaniensis)
- Southern Catalpa (Catalpa bignonii)
- Paw Paw (Asimina triloba)
- American Persimmon (Diospyros virginiana)
- Eastern Redbud (Cercis canadensis)
- Flowering Dogwood (Cornus florida)
- Witchhazel (Hamamelis virginiana)
- Flame Azalea (Rhododendron calendulaceum)
- American Holly (Ilex opaca 'Jerzy Knight')
- Serviceberry (Amelanchier spp.)
- Rugosa Rose (Rosa rugosa)
- Rugosa Rose (Rosa rugosa 'Hansa')
- Meadow Grasses

Creek Bed Plants:
- Trillium (Trillium grandiflorum)
- Bigroot Geranium (Geranium macrorrhizum)
- Sweet Flag Grass (Acorus gramineus)
- Swamp Milkweed (Asclepias incarnata)
- Dwarf Joe Pye Weed (Eupatorium purpureum)
- Butterfly Weed (Asclepias tuberosa)
- Hairy Alumroot (Heuchera villosa)
- Virginia Bluebell (Mertensia virginica)

Note: Tree symbols represent approximate mature size.
**Service Berry**  
*Amelanchier spp.*

Zone 4, full sun,  
Small to large shrub (can prune to tree form), 4-6 ft. x 10-15 ft.  
Hardy and adaptable, early flowering, red to orange foliage in fall, edible fruit, naturally found at forest edges.

**Paw Paw**  
*Asimina triloba*

Zone 5b, full sun/part shade  
Medium size suckering tree, 20-35ft. x 20-35ft.  
Understory tree found near stream banks, edible fruit

**Yellow Birch**  
*Betula alleghaniensis*  

Zone 4, full sun,  
Small to large shrub (can prune to tree form), 4-6 ft. x size desired.  
Hardy and adaptable, early flowering, red to orange foliage in fall, edible fruit, found at edges.

**Southern Catalpa**  
*Catalpa bignoniondes*  

Zone 5, full sun/partial shade  
Large Tree; 30-40ft. x 30-40ft.  
Beautiful flowers in late May. Very tolerant of different soil conditions and can take alkaline soil, may be difficult to purchase.
**Eastern Redbud**  
*Cercis canadensis*  
Zone 4, full sun/shade  
Small Tree 20-30ft. x 25-35ft.  
Adaptable to pH, good in many soil types (except very wet), beautiful flowers in early spring.

**Flowering Dogwood**  
*Cornus florida ‘Cherokee Sunset’*  
Zone 5, full sun/partial shade, moist soil,  
Small Tree 15-20ft. x 15-20ft.  
Excellent vigor and resistance to anthracnose, good fall color from pink to red/purple.

**American Persimmon**  
*Diospyros virginiana*  
Zone 5, full sun,  
Large Tree can sucker, 50-75ft. x 50-75ft.  
Edible fruit, grows well in poor sandy soil and is an early mid-succession species.

**American Beech**  
*Fagus grandifolia*  
Zone 4, full sun,  
Large Tree, 90-100ft. x 50-75ft.  
Large muscular trunk, good for climbing, excellent shade tree.
**Witch Hazel**  
*Hamamelis virginiana*

Zone 3b, full sun/shade prefers moist stream banks  
Small Tree 20-30ft. 20-25 ft.  
Beautiful yellow, fragrant flowers in fall.

**American Holly**  
*Ilex opaca ‘Jerzy Knight’*

Zone 5b, part shade/part sun  
Small Tree, 35-50ft.x 15-25 ft.  
Evergreen, showy red berries in winter

**Sweetspire**  
*Itea virginica*

Zone 5, full sun,  
Large Tree can sucker, 50-75ft. x 50-75ft.  
Edible fruit, grows well in poor sandy soil and is a early mid-succession species.

**Tulip Poplar**  
*Liriodendron tulipifera*

Zone 4, full sun, pH adaptable  
Loves deep well drained loam, slightly acidic soil, fast growing  
Large Tree: 70-90ft. x 35-50ft.  
Beautiful in large group ing, good fall color (yellow).
**Red Oak**  
*Quercus rubra*

Zone 3b, full sun  
Low pH soils, fast growing  
Large Tree: 50-65 ft. x 50-65 ft  
Nuts for wildlife  
Excellent tree when properly grown.

**Flame Azalea**  
*Rhododendron calendulaceum*

Zone 6, full sun to part shade  
Medium shrub, 8 ft. x 8 ft.  
Showy yellow to red orange flowers in late spring to summer, prefers higher acidic soil of 4.5-5.5 pH

**Rugosa Rose**  
*Rosa Rugosa*

Zone 5, full sun,  
Large Tree can sucker, 50-75 ft. x 50-75 ft.  
Edible fruit, grows well in poor sandy soil and is an early mid-succession species.

**Black Willow**  
*Salix nigra*

Zone 2, full sun,  
Large Tree, 45 ft.-70 ft. x 45 ft.-70 ft.  
Excellent for absorbing ground water
Creek Bed Plants

The dry creek bed is designed to be an 8-10 ft. wide channel with a 2-4 foot wide rock lined swale in the center. The remainder of the channel should be densely planted with hearty plant material that can withstand periods of drought as well as inundation. The list of plants CDAC has compiled are naturally occurring creek bed plants.

Sweet Flag Grass
Acorus gramineusogon

Zone 4-8, full sun - part shade
Size: 24-36”
Requires moist soils, should be located in the lowest areas within the creek bed.

Swamp Milkweed
Ascelpias incarnata

Zone 3-9, full sun to part sun
Size: 2’-4’
Attracts butterflies and, requires average to dry soils and should be located in higher areas of the creek bed.

Butterfly Weed
Ascelpias tuberosa

Zone 3-9, full sun to part sun
Size: 3’-5’
Attracts butterflies and larvae, requires average to dry soils and should be located in higher areas and around edges of the creek bed.
Joe Pye Weed
Eupatorium purpureum

Zone 5-10, full sun
Size: 2’-6’
Requires moist soils and should be located in the bottom of the creek bed, flowers pale pink to purple in July-September

Bigroot Geranium
Geranium macrorhizum

Zone 3-8, full sun to part shade
Size: 8”-1’
Low growing, spreads, blooms April-July purple-deep red, can be placed on banks of creek bed.

Hairy Alumroot
Heuchera villosa

Zone 4a-9b light shade to full shade
Size: 6”-12”
Sometimes called Coral Bells, many color varieties
Very drought tolerant, blooms, late summer, early fall

Blue Flag Iris
Iris virginica shrevei

Zone: 3a-10a, full sun to partial shade
Size: 2’-3’
Requires moist soil, so should be located in the bottom of the creek bed. Blooms mid-season, blue to purple flowers.
**Virginia Bluebell**  
*Mertensia virginica*

Zone: 3a-9b, partial to full shade  
Size: 18”-24”  
Blooms light blue clusters in mid spring, need moist soil, plant in bottom areas of the creek bed.

**Trilium**  
*Trilium grandiflorum*

Zone: 4-9 part shade to full shade  
Size: 12”-18”  
Low growing naturalizing ground cover, requires medium moisture, should be planted in the lower portions of the creek bed.
Creek Bed Construction Details

**Dry Creek Bed**
*Typical Section*

- **Suggested Creek Bed Plants**
- **Stone Lined Channel**
  - Varying Width (2'-4')
  - 1-3" Cobble Gravels
  - 7-9" Smooth Stones
- **3:1 Max**
- **Optional Engineered Soil**
  - 16" Minimum
  - Soil, Sand and Gravel Mixture
- **8'-10'**
- **2'-4'**

**Check Dam**
*Typical Section*

- **Spaced According to Swale Slope**
- **12" Maximum**
- **6" Minimum Footer**

*Check Dams are required when slope of swale is greater than 2.5%*

These suggested details are designed based on the Virginia Department of Conservation and Recreation (DCR)'s specifications for Dry Swales. See Appendix B for more information.
The Stone Weir walls are designed to define larger areas of ponding on the site. The walls are constructed of various size stone and gravel and stacked sturdily but with some holes to allow water to pass gently through. In addition, 1 inch PVC pipe weep holes should be incorporated. Some stone found on the site during recent construction could be re-purposed here. The wall height should be a maximum of 12 inches.
Conclusion

The CDAC team submits this final report and conceptual design for the Mount Tabor Meadows Common Space, with the hope that the implemented design will serve as a place for recreation, education, natural beauty and be a conscious effort toward increasing environmental stewardship in the community. The new common space will be a place that is not only fun to use and beautiful to look at but, it will serve as an example of designing natural systems and their services for the surrounding communities.
Appendices

Appendix A.................................................................Plant Schedule and Alternatives
Appendix B.............................................................DCR Specifications for Dry Swales
Appendix C............................................................Kaboom Design Competition
Appendix D.............................................................Sun Study
Appendix E.........................................................Barn Swallow Housing
### Appendix A: Plant Schedule and Alternatives

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Common Name</th>
<th>Quantity</th>
<th>Size</th>
<th>Notes</th>
<th>Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amelanchier spp.</td>
<td>Serviceberry</td>
<td>19</td>
<td>Bare root. Serviceberry is fast growing so small sizes are okay</td>
<td>Multi-trunked or standard trunk are options; Specify which one is desired when ordering.</td>
<td></td>
</tr>
<tr>
<td>Asimina triloba</td>
<td>Paw Paw</td>
<td>3</td>
<td>whatever is available</td>
<td></td>
<td>May be difficult to find. Difficult to transplant. Two (male and female) are needed if fruit is desired. <a href="http://www.crfg.org/pubs/fl/pawpaw.html">http://www.crfg.org/pubs/fl/pawpaw.html</a> provides good information about cross-pollination and cultivars. W<a href="http://www.ediblelandscaping.com">ww.ediblelandscaping.com</a> carries these, the largest size they offer being 3 gal. container plants.</td>
</tr>
<tr>
<td>Betula alleghaniensis</td>
<td>Yellow Birch</td>
<td>4</td>
<td>container or B &amp; B</td>
<td>May be difficult to find and perhaps slow to establish. Soil needs to be uncompacted—that is important for long term survival. Careful post establishment irrigation is important.</td>
<td>Black (Sweet) Birch - Betula lenta</td>
</tr>
<tr>
<td>Catalpa bignoniondes</td>
<td>Southern Catalpa</td>
<td>2</td>
<td>Availability may be limited</td>
<td></td>
<td>Yellowwood (Cladrastis kentuckea) would have a similar crown shape, size and bloom time. Though it is a larger tree, bigleaf magnolia is a large-leaved flowering native (Magnolia macrophylla).</td>
</tr>
<tr>
<td>Cercis canadensis</td>
<td>Eastern Redbud</td>
<td>5</td>
<td>B&amp;B is desirable; bare root is cost effective and may also work</td>
<td>b and b is desirable. Bare root might work (look up in Dirr) and would be cheaper. Dirr notes b&amp;b and container plants. <a href="http://www.cornell.edu/">Creating the Urban Forest: The Bareroot Method from Cornell</a> notes this is a moderately difficult species to transplant as bareroot, though fall planting increases success.</td>
<td></td>
</tr>
<tr>
<td>Cornus florida</td>
<td>Flowering Dogwood</td>
<td>2</td>
<td>container or B&amp;B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diospyros virginiana</td>
<td>American Persimmon</td>
<td>3</td>
<td>Container plant is desirable</td>
<td>Available for order online if not easily located in nurseries.</td>
<td></td>
</tr>
<tr>
<td>Fagus grandifolia</td>
<td>American Beech</td>
<td>5</td>
<td>B and B and decent size probably desirable (2-3 inch caliper)</td>
<td></td>
<td>Fagus sylvatica. If native trees are a higher priority than having a Beech, Quercus rubra (red oak), Quercus alba (white oak) are good alternatives.</td>
</tr>
<tr>
<td>Hamamelis virginiana</td>
<td>Witchhazel</td>
<td>12</td>
<td>container or B&amp;B; Suggested height - 3 to 5 feet tall, depending on cultivar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ilex opaca 'Jersey Knight'</td>
<td>American Holly</td>
<td>5</td>
<td>container or B&amp;B</td>
<td></td>
<td>Dirr recommends using a cultivar; ‘Dan Fenton’, ‘Farage’ and ‘Old Heavy Berry’ are given good remarks. Of course, selection will depend on what’s available.</td>
</tr>
<tr>
<td>Itea virginica</td>
<td>Sweetspire</td>
<td>22</td>
<td>container or B&amp;B</td>
<td>Make sure pH is below 7 or preferably 6.5</td>
<td></td>
</tr>
<tr>
<td>Liriodendron tulipifera</td>
<td>Tulip Poplar</td>
<td>6</td>
<td></td>
<td>Best to avoid bare root—as it can dessiccate easily. Fast growing</td>
<td></td>
</tr>
<tr>
<td>Quercus rubra</td>
<td>Red Oak</td>
<td>4</td>
<td>b and b is best 2-3 inch caliper</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Botanical Name</td>
<td>Common Name</td>
<td>Quantity</td>
<td>Size</td>
<td>Notes</td>
<td>Alternatives</td>
</tr>
<tr>
<td>--------------------------------</td>
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<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Rhododendron calendulaceum</td>
<td>Flame Azalea</td>
<td>17</td>
<td>container</td>
<td>Can be difficult to establish. Availability may be limited. Make sure compaction is very low and post transplant irrigation maintained for at least 2 growing seasons. Meadowbrook Nursery (<a href="http://www.we-du.com">www.we-du.com</a>) in North Carolina has these, 1 gal. through mail order, 3 gal. if you want to pick it up at their nursery.</td>
<td>Fothergilla (Fothergilla major ‘Mt.Airy’) will have white flowers in early spring and excellent fall color. Another idea would be oakleaf hydrangea (Hydrangea quercifolia ‘Snow Queen’ or ‘Alice’) which has generous white blooms in early summer and good burgundy fall color.</td>
</tr>
<tr>
<td>Rosa Rugosa</td>
<td>Rugosa Rose</td>
<td>18</td>
<td></td>
<td>Very tough plant</td>
<td></td>
</tr>
<tr>
<td>Salix nigra</td>
<td>Black Willow</td>
<td>2</td>
<td>bare root, container, or B&amp;B</td>
<td>Very tough plant</td>
<td>Weeping Willow - Salix babylonica</td>
</tr>
</tbody>
</table>

**Creek Bed Plants**

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Common Name</th>
<th>Quantity</th>
<th>Size</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acorus gramineus ogon</td>
<td>Sweet Flag Grass</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asclepias incarnata</td>
<td>Swamp Milkweed</td>
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<tr>
<td>Asclepias tuberosa</td>
<td>Butterfly Weed</td>
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<tr>
<td>Eupatorium purpureum</td>
<td>Dwarf Joe Pye Weed</td>
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<td></td>
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<tr>
<td>Geranium macrorrhizum</td>
<td>Bigroot Geranium</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Heuchera villosa</td>
<td>Hairy Alumroot</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iris virginica shrevei</td>
<td>Blue Flag Iris</td>
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</tr>
</tbody>
</table>
Appendix B: DCR Specifications for Dry Swales

As the Mount Tabor Meadows community continues to grow, stormwater infiltration will be increasingly important. The DCR specifications for Dry Swales is an excellent tool to be used to insure proper design of the Dry Creek Bed which is included in the MTM Commons design. The full version of the DCR specifications can be viewed online at www.dcr.virginia.gov

SECTION 1: DESCRIPTION

Dry swales are essentially bioretention cells that are shallower, configured as linear channels, and covered with turf or other surface material (other than mulch and ornamental plants).

The dry swale is a soil filter system that temporarily stores and then filters the desired Treatment Volume ($T_v$). Dry swales rely on a pre-mixed soil media filter below the channel that is similar to that used for bioretention. If soils are extremely permeable, runoff infiltrates into underlying soils. In most cases, however, the runoff treated by the soil media flows into an underdrain, which conveys treated runoff back to the conveyance system further downstream. The underdrain system consists of a perforated pipe within a gravel layer on the bottom of the swale, beneath the filter media. Dry swales may appear as simple grass channels with the same shape and turf cover, while others may have more elaborate landscaping. Swales can be planted with turf grass, tall meadow grasses, decorative herbaceous cover, or trees.
Appendix C: Kaboom Grant Competition

During the course of the design process, MTM community members discovered a grant competition sponsored by Kaboom.org, a national non-profit playground provider. The design competition required the community to create a webpage on Kaboom.org in which community members could become members of the project and support the process, write comments and ideas on the discussion board and ultimately convey the vision for the Commons. The grand prize for the competition was up to a $5000 discount to be used to purchase new playground equipment. The CDAC team helped to organize the website, provided the necessary drawings and support for the community. The competition was judged by a celebrity panel of designers and citizens, including Miss America. The MTM Commons was selected as a finalist and then a national voting contest ensued. MTM finished first.

The Kaboom contest was not only a way to raise funding for the playground equipment, but it was an excellent means to help get the community involved and informed in the work that was happening related to the MTM Commons. Many individuals from the surrounding area became involved in the project and it also received some media recognition. The Roanoke Time, NRV Current and News Channel 10 all featured the competition at some point.
Appendix D: Sun Study

December 9AM

December 1 PM

December 4 PM
Appendix D: Sun Study

March 9 AM

March 1 PM

March 4 PM
Appendix D: Sun Study

June 9 AM

June 1 PM

June 4 PM
Appendix E: Barn Swallow Housing

Coveside Bird Houses

Swallow Houses

Barn Swallows breed from Alaska across Canada, throughout the United States, and south through central Mexico. With the proliferation of human-provided nesting sites, the North American Barn Swallow population has increased in most places during the 20th century. Numbers are especially up in the central and eastern United States. Barn Swallows show strong fidelity to their natal site, most nesting within 20 miles of their birthplace and some much closer. Members of a pair typically stay together to raise a second brood and return in successive years to the same nest site. If you have the right habitat, barn swallows are easy to attract. A simple nesting perch may be placed under the eaves, inside a garage or barn, or on the side of a building.

Tree Swallows are found all across the continental United States and Canada, and in parts of Alaska, as far north as cavities are available, avoiding only the southeastern corner of the U.S. Tree Swallows prefer open habitats, such as the edges of woods, and areas near water, including marshes, shorelines and swamps. Tree Swallows are quite tolerant of humans. Nesting is quite synchronous in Tree Swallows; that is, females tend to begin nesting within a week or 10 days, usually in April, of their neighbors. Tree Swallows nest in natural tree cavities, woodpecker holes and nest boxes. Tree Swallow houses should be placed 5 to 15 feet high on a post or tree in open areas. They should be spaced 30 to 100 feet apart with the entrance hole facing east.

Violet-green Swallows are found from the Rocky Mountains west to the Pacific coast. Their range spans from central Alaska and central Canada south to the Mexico’s highlands. Violet-green Swallows prefer open, deciduous, or mixed coniferous-deciduous forests containing ponderosa pine, aspen, willow and spruce trees. In the northern part of its range, this species breeds at lower elevations on the coast and in wooded canyons. In the southern part of their range, they
Appendix E: Barn Swallow Housing

Barn Swallows and Cliff Swallows, under the eaves of buildings, and in nest boxes. They can nest in close association with Cliff Swallows, Tree Swallows, White-throated Swifts, and Western Bluebirds. One report documented a pair of Violet-greens assisting a pair of Western Bluebirds in raising young. The swallows guarded the nest and tended the bluebird nestlings, and after the bluebirds fledged, the swallows used the nest site. In the northern portion of their range, pair formation begins in mid-April and breeding begins in late May. In the southern portion, breeding begins in early May. Violet-green Swallow houses should be placed 9 to 15 feet high in open or broken deciduous or mixed deciduous-coniferous forests, wooded canyons, or edges of dense forests.

Barn Swallow House $27.95

Tree Swallow House $25.95

Violet-green Swallow House $25.95

Backyard Bird House $29.95

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