DIVISION 32—EXTERIOR IMPROVEMENTS

FORMAT
1. Technical specifications content and numbering system shall be based on the 2004 version of CSI MasterFormat.

BASIS OF DESIGN
1. BGSU Design standards shall not replace fully developed, project and market specific technical specification. Architect/Engineer(A/E) shall utilize the Standards as a minimum standard to guide the design and execution. Exceptions to these standards are allowed provided they are approved by Design & Construction.
2. In instances where fewer than 3 manufacturers are indicated, the A/E shall insert “or approved substitute” in the products section of the technical specifications.
3. All submitted substitute products shall be brought to the attention of Design & Construction prior to approval.

RELATED SECTION
1. 03—Concrete

GENERAL PROVISIONS
1. In most cases, if the quantity of the pour merits it, concrete testing shall be conducted by a testing agency agreed to by the Project Manager.
   a. Do not use ground granulated blast-furnace slag as an additive or substitute aggregate.
      A/E shall include contractor testing responsibilities in the technical specifications.
   b. Contractor shall submit a written test schedule to the A/E for approval.
   c. Tests shall be for:
      i. base compaction
      ii. air content
      iii. slump
      iv. strength
   d. Test reports shall be supplied to A/E and Project Manager for review and approval.

32 12 16—HOT-MIX ASPHALT PAVING
1. BGSU has adopted the latest edition of State of Ohio, Department of Transportation, Construction and Material Specifications for all paving.

32 13 13—CONCRETE PAVEMENT
1. A/E shall place the following note conspicuously on the drawing showing concrete work:

   “Contractor has sole responsibility to protect newly
poured concrete from graffiti. Contractor shall coordinate pour times with the Project Manager or A/E, in order to optimize cure time before the new concrete is unattended, and state how they intend to eliminate the risk for graffiti or damage. Should graffiti or damage appear in the concrete within 24 hours after the pour, contractor shall replace the area affected at no cost to the University.”

a. A/E shall take extra measures by also noting in the specification, at the Pre-bid and Pre-construction meetings to ensure contractor understands his responsibility.

2. Pedestrian Walks
a. Minimum Width: 6’-0”
b. Minimum Concrete Thickness: 5½”
c. Minimum Base Thickness: 4”
d. Compressive Strength: 4,000 psi after 28 days
e. Base Compaction: 95%
f. Reinforcing: Synthetic fiber admixture

3. Service Drives
a. Minimum Concrete Thickness: 8”
b. Minimum Base Thickness: 6”
c. Compressive Strength: 4,000 psi after 28 days
d. Base Compaction: 99%
e. Reinforcing: Synthetic fiber admixture & W4.0 x W4.0 wire mesh

4. Control and Expansion Joints
a. Control Joints shall be equal to the width of the walk.
b. The distance between control joints in either direction shall not exceed 8’-0”.
c. Expansion Joints shall be placed every fourth control.

5. Finish
a. All walks and service drives shall have a medium broom finish with 2” wide “window pane” hand-tooled finish on edges, control & expansion joints.
b. Under no circumstances shall joints be installed by saw cutting.

6. Curing and Sealing
a. Apply non-staining, non-yellowing curing and sealing compound to all concrete walks. Use a two-step process where a film-forming curing compound is applied and then followed-up with a sealing compound after curing compound is removed; or a single-step curing and sealing application.

32 17 23—PAVEMENT MARKINGS
1. Vehicle space width shall be nominally 8’-0” x 20’-0”.
2. Parking space between stalls and rows striping shall be white.
3. No parking areas, fire lanes, and end of row lines shall be yellow.
4. Handicap spaces shall be blue.

32 31 19—DECORATIVE METAL FENCES AND GATES
1. Coordinate the need to install Post & Chain Fence with Design & Construction.
   a. Paint shall be one coat of primer and two coats of alkyd “BGSU Bronze.”
   b. Around curves, posts shall be placed to minimize abrupt angles.
   c. Fence shall be designed per the design below:

32 84 00—PLANTING IRRIGATION
1. General
a. A/E shall work with BGSU Grounds Department, at 419 372-7650, in order to identify potential conflicts of existing irrigation system during construction.
   i. In instances where the irrigation system needs to be redesigned in order to accommodate construction, A/E shall identify the scope of services and inform the project manager in writing if there will be an impact on the budget or scope.

b. A/E shall place the following note conspicuously on drawings where there will be work affecting existing irrigation systems:

   “Prior to working, contractor shall contact BGSU Grounds Department, at 419-372-7650, to have irrigation system controls, sprinkler heads and lines located. Contractor shall coordinate work with the Grounds Department to ensure irrigation system will not be damaged during construction.”

2. Irrigation System Design
   a. A/E shall coordinate the design of the irrigation system with BGSU Grounds Department, 419-372-7650; and Century Equipment, 5959 Angola Rd., Toledo, OH 43615, 419-724-1585, incorporating equipment, material and construction standards developed by and available from Century Equipment.

3. Irrigation Installation
   a. The irrigation installer shall be Toro Sentinel Certified.
   b. Installer shall submit to BGSU documentation proving Sentinel Certification, showing certification number, date & location.

32 92 00—TURF AND GRASSES
1. Grass seed mix ratio:

<table>
<thead>
<tr>
<th>Contents</th>
<th>Pure Seed</th>
<th>Germ</th>
<th>Origin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perennial Ryegrass</td>
<td>39.80%</td>
<td>90%</td>
<td>Oregon</td>
</tr>
<tr>
<td>Arc Kentucky Bluegrass</td>
<td>29.10%</td>
<td>85%</td>
<td>Wash</td>
</tr>
<tr>
<td>Boreal Creeping Red Fescue</td>
<td>14.88%</td>
<td>85%</td>
<td>Canada</td>
</tr>
<tr>
<td>Britanny Chewings Fescue</td>
<td>14.84%</td>
<td>85%</td>
<td>Oregon</td>
</tr>
<tr>
<td>Other Crop Seeds</td>
<td>0.09%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inert Matter</td>
<td>1.28%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weed Seeds</td>
<td>0.01%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noxious Weeds</td>
<td>0.00%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. Obtain grass seed from Caroll Landscape, 567-703-1035, or other supplier approved by Project Manager.

3. Install minimum of 6" of topsoil having a minimum of 6 percent organic material content; free of stones 1 inch or larger in any dimension and other extraneous materials harmful to plant and turf growth. Prior to Hydroseeding, remove any sticks, stones or other debris with a Rock Hound Harley Rake or similar equipment approved by the BGSU project manager.

4. Use only hydroseed. Do not use straw.

5. Ordinarily there is no need for shady seed mix. Use only after reviewing site conditions with Project Manager.

6. On projects where the landscaping is estimated to be $10,000 or more:
   a. Landscape architect shall develop full technical specification including establishing a seed mix using the above mix thresholds based on soil analysis and use characteristics, e.g., athletic fields, increased quantity of Kentucky Blue Grass, etc.
   b. Work shall be performed by an Ohio Certified Landscaper.

7. Seeding shall occur from August 1 to October 15, and March 15 to May 31.

**32 93 00—PLANTS**

1. In all projects, no more than 25% of all plants shall be of one species.

**32 93 43—TREES**

**Planting**

1. Verify location of subsurface utilities prior to beginning the tree planting operation by submitting an OUPS ticket.

2. Newly planted trees are to have a minimum of a 2” trunk diameter measured at 4.5’ above root-flare (DBH – diameter at breast height). Any plant material smaller will be rejected.

3. Root-ball will be placed into a hole no less than 12” wider than the root-ball itself and the root-flare level with existing grade. If root-flare is deeper than existing grade the tree will be pulled back up and replanted properly. See Figure A.
4. Remove top 1/3 of wire basket and pull back burlap and twine. See Figure A and B.
5. Backfill with loose soil incorporated with a 50/50 mix of compost and topsoil. Gently pack soil down and finish off by watering in the tree to remove any air pockets that may have formed in the backfill.
6. Mulch tree with a natural hardwood double processed mulch at 3” thick and a 3’ diameter ring around the trunk for a 2” tree. Adjust mulch ring accordingly.
with larger caliper trees. See Figure A.
7. Stake tree by using a double t-post method or a 3 short stake method using wire and hose chunks. Larger caliper trees may require additional staking. See Figure C.

![Figure C](image)

8. All newly planted trees require a tree gator bag for watering purposes.
9. Newly planted trees will come with a 1-year warranty.
10. All trees will be inspected on proper planting and tree health by a certified arborist.
11. Contractor will maintain newly planted trees until project is released to Campus Operations.

**Mechanized Tree Spade Relocation**
1. Trees shall be relocated with a mechanized tree spade. Do not use tree spade to move trees larger than the manufacture’s maximum size recommendation for the tree spade being used.
2. Verify location of subsurface utilities prior to beginning tree spade operation by submitting an OUPS ticket.
3. The minimum tree spade diameter shall be equal to the minimum root-ball diameter of a similar field-grown balled-and-burlapped tree according to ANSI Z60.1. For trees over 8” caliper, the minimum tree spade diameter shall be 10 times the caliper of the tree.
4. 24 hours prior to digging the contractor shall water the entire root zone of the tree with at least 50 gallons per inch DBH of trunk.
5. When extracting the tree, center the trunk within the tree spade and move tree with a solid ball of earth.
6. Cut exposed roots cleanly during transplanting operations.
7. Use the same tree spade to excavate the planting hole as was used to extract and transport the tree.
8. After planting the tree, the contractor shall mulch tree at least 12” past tree spade diameter. Mulch thickness shall be 3”. Water the tree throughout entire mulched area with at least 20 gallons per inch DBH of trunk.

**Planting Restrictions**
1. Trees shall not be planted any closer than 10ft of sidewalks, street/parking lot curbs or tunnels.
   a. Exception for small ornamentals and medium sized trees if being installed within a mulched landscape bed.
2. Trees shall not be planted any closer than 15ft to light poles
3. Trees shall not be planted next to buildings and other structures to certain minimums depending on type of tree – Large trees 25ft minimum, medium trees 15ft minimum, small ornamental trees 5ft minimum.
   a. See the City of Bowling Green, Ohio Landscape Guide for Developers, Businesses, and Home Owners for definition and species of large, medium, and small trees.

**Prohibited Trees**
Willow – All varieties
Mulberry
Tree of Heaven
Walnut
Callery Pear
Russian Olive
Red Maple (restricted areas, needs approval)
Fruit trees – All varieties
Norway Maple (exception purple leaf Norway maples)
Large evergreens within campus – spruce, fir, pine

**Preservation**
In accordance with the International Society of Arborist (ISA), American National Standards Institute (ANSI), and the Tree Care Industry Association (TCIA) the following is a set standard for tree care and preservation for Bowling Green State University.

**Pre-Construction**
1. Walk site with certified arborist to create an onsite tree inventory of all trees to be preserved.
2. List tree species, size, caliper diameter, crown size, critical root zone, and current value of each tree.
a. Critical root zone is 1.5ft of radial distance for every inch of tree diameter measured at 4.5ft above the ground with a minimum of 8ft radial distance.
   - If 8ft is not possible then mulching or wood chips are to be added to the area effected by compaction not to exceed 6” in depth.
b. Current value of what the trees cost for purposes of replacing one for one or to replace to the dollar amount of trees damaged or destroyed by contractor.
   - New trees purchased for replacement are to be 2” diameter or larger.
3. List tree health along with any prior defects.
4. List of recommendations for preservation procedures.
5. Areas need marked and fenced off prior to any grading or construction activity on site.
   a. Orange snow fencing needs to be installed around the perimeter of the designated critical root zone. See Figure D.
   b. Signs need to be posted reading “TREE PRESERVATION AREA—KEEP OUT”.
   c. If re-grading occurs within the critical root zone, then root pruning with a trencher at the point of disturbance will be performed by a certified Landscape Technician. See Figure E.

Construction
1. The sites for preservation should be walked and monitored throughout the construction phase noting any soil compaction, root injury, limb and trunk injury, and amount of water in the areas.
   a. If damage has been caused, steps to reduce the issue must be taken.
2. If re-grading occurs within the critical root zone, then root pruning with a trencher at the point of disturbance will be performed by a certified Landscape Technician. See Figure E
3. Backfill with loose soil incorporated with a 50/50 mix of compost and topsoil. Gently pack soil down and finish off by watering in the tree to remove any air pockets that may have formed in the backfill.
4. Mulch tree with a natural hardwood double processed mulch at 3” thick and a 3' diameter ring around the trunk for a 2” tree. Adjust mulch ring accordingly with larger caliper trees. See Figure A.
Post Construction

1. Upon completion of construction trees will be re-evaluated on tree health by a certified arborist.
   a. Any broken limbs or trunk damage will be properly pruned and accessed by a professional arborist.
   b. If soil compaction occurred in critical root zone, then vertical mulching may need to be performed by a certified Landscape Technician. See Figure F.
   c. Trees will also be re-evaluated 1 year after completion by a certified arborist to access damage unseen after initial competition.
      - Ex. Root damage during construction that was unseen or root compaction.
      - Any trees damaged beyond restoration or have died shall be replaced at the cost of the trees current value noted in initial evaluation.
Plastic Mesh Tree Protection Fence

ANCHOR POSTS MUST BE INSTALLED TO A DEPTH OF NO LESS THAN 1/3 THE TOTAL HEIGHT OF POST

Notes:
1. Blaze orange or blue plastic mesh fence for forest protection device, only.
2. Boundaries of Retention Area will be established as part of the forest conservation plan review process.
3. Boundaries of Retention Area should be staked and flagged prior to installing device.
4. Avoid damage to critical root zone. Do not damage or sever large roots when installing posts.
5. Protection signs are required.
6. Device should be maintained throughout construction.

Source: Adapted from Prince George's County, Maryland: Woodland Conservation Manual and Forest Conservation Manual, 1991

Figure D
Root Pruning

Notes:
1. Retention Areas to be established as part of the forest conservation plan review process.
2. Boundaries of Retention Areas to be staked, flagged and/or fenced prior to trenching.
3. Exact location of trench should be identified.
4. Trench should be immediately backfilled with soil removed or organic soil.
5. Roots should be cleanly cut using vibratory knife or other acceptable equipment.

Source: Adapted from Steve Clark & Associates/ACRT, Inc. and Forest Conservation Manual, 1991

Figure E
Application of Fertilizers

**Vertical Mulching or Fertilizing**

1. Auger holes 8"-10" deep, 2'-3' apart, 1'-3' wide.
2. Leave soil on ground.
3. Apply fertilizer 1/3 distance in from dripline to trunk.
4. Fertilize with 50/50 compost and pine fines.

**Application of Fertilizer by Injection**

1. Injection holes to be 8"-10" deep, 2'-3' apart.
2. Auger holes, do not poke. Leave soil on ground.
3. Apply fertilizer 1/3 distance in from dripline to trunk and extend 2/3 out from dripline.

Source: UMCP

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**Figure F**

End of Section