



UC DAVIS ARBORETUM PATHWAY REHABILITATION PROJECT Construction Competition Rules

**Competition Rules – Version 1.1
Published: December 11, 2015
Designs Due: January 31, 2016**

TABLE OF CONTENTS

1.0	PURPOSE	1
2.0	SCENARIO	1
2.1	Competition Scope	1
3.0	SUBMITTALS	2
3.1	Design Submittals.....	2
3.2	Plan Submittals	2
3.3	Presentation.....	4
3.4	Construction.....	4
4.0	SCORING.....	4
4.1	Design	5
4.2	Plan Submittals	5
4.3	Presentation Phase.....	5
4.4	Construction Phase.....	5
5.0	PROJECT TENTATIVE DEADLINE.....	6
6.0	MATERIALS	7
7.0	CONTACTS	8

FIGURES/APPENDIX

Score Sheet

Campus Specifications for Concrete Paving

Additional Specifications

Surveyed Site

UC Davis Arboretum Pathway Rehabilitation Project ASCE Construction Management Competition - Rules

1.0 PURPOSE

The ASCE Construction Management Competition allows students to apply real-world management and construction skills in a friendly competitive environment. Teams are expected to act as design-build construction firms preparing construction planning information and presenting and executing the plan for a feature that improve the student experience at the host campus. Teams will be required to complete the initial design, and then plan, construct, and present their plan and the new feature. It is the goal of this competition to provide a hands-on experience for the next generation of construction engineers. The project itself is a real construction project, improving existing pathways and providing benefits to the community and handicap accessibility.

2.0 SCENARIO

The UC Davis Arboretum is home to a wide array of plant/animal life and is undergoing important upgrades that result in an increased number of visitors every year. Asphalt and decomposed granite pathways connect the lawns, recreational areas, and educational exhibits present at the Arboretum along Putah Creek. The existing asphalt and decomposed pathways are currently transitioned by edged curbs that do not comply with ADA Standards for Accessible Design, limiting the Arboretum's exposure within the Davis community.

The 2016 Construction Competition is a design-build project focusing on the construction of concrete aprons at intersections between asphalt and decomposed granite pathways. The construction of these aprons will ultimately allow for the pathways to be up to date with ADA standards for maximum access.

Five sites have been selected for these improvements at the Acacia Grove in the UC Davis Arboretum. Teams are expected to complete the design and develop and execute a plan for construction of the new concrete aprons that make numerous pathways in the Arboretum accessible to everyone in the community.

2.1 Competition Scope

The 2015 Construction Management Competition will be composed of four phases:

- Design Phase
- Planning Phase
- Construction Phase
- Presentation Phase

3.0 SUBMITTALS

3.1 Design Submittal

In the Design Phase competitors will be given a surveyed sketch of each site based on a lottery system. The competitors will then be expected to create a completed design on AutoCAD consisting of critical dimensions, major components, and materials. The team will prepare the final materials list including quantities and detailed construction drawings.

To ensure that the construction phase is in compliance with building codes and campus specifications, **the first design submission will be due January 31, 2016.** This submission will be reviewed for adherence to codes and will be returned no later than **February 20, 2016.** Designs that are not approved must be amended and resubmitted for review. A final approved design is to be included in the final Project Plan.

Designs must be created in AutoCAD and submitted in PDF format. Preliminary design submissions must be submitted under the filename <School_Name-CM_Design_2016.pdf> to <shallwani@gmail.com>.

Designs will be scored based on constructability, aesthetics, adherence to specifications, and presentation quality. The document must be submitted by the submission deadline to be considered for the competition.

3.2 Plan Submittal

In the Planning Phase competitors will prepare a formal project plan report that contains detailed construction planning information pertaining to each team's project. Project Plans will score points based on specific parameters within the plan, as well as plan format.

Plans are due March 18, 2015, two weeks prior to the first day of construction and will consist of the elements described below.

3.2.1 *Strengths, Weaknesses, Opportunities and Threats (SWOT)*

Teams will prepare a SWOT analysis and show it in a table.

Minimizing risks and maximizing safety during construction are both high priorities for the competition. Each team will prepare a comprehensive list of risks and timely construction as part of their SWOT analysis.

3.2.2 *Work Breakdown Structure (WBS)*

A WBS will be prepared for the two-day construction process and presented in a figure.

3.2.3 *Schedule and Staffing*

A table will be developed with the expected duration of each sub-task in the WBS and also showing precedence. A schedule will be prepared showing expected start, end and duration of each task. This shall be prepared using a Gantt chart that is not more than one page wide (landscape). In addition to this chart, teams must also prepare a staffing plan that outlines which team members will be working on which construction tasks. Teams are required to include a minimum half-hour break for every four (4) continuous hours of work.

Each plan must include an estimate for the project construction. This includes costs of materials, labor, and equipment. These values are to be presented in an organized and professional manner. Material and equipment costs must be based on the monetary values given in the tables included in this package. Labor costs will be based on the number and duration of team members participating in construction.

3.2.4 *Materials List*

Teams are presented with an initial list of available materials for construction. Construction shall consist only of materials from this. This list should be updated and quantities calculated based on the team's final design. The list must specify the amount of each material (weight, volume, count, etc.) being used.

3.2.5 *Quality Management Plan*

A description of methods and practices that ensure quality construction shall be included in the project plan and adhered to during construction.

3.2.6 *Format*

Teams are expected to present a professional plan that meets these requirements:

- a. General: One-inch margins, 12 point Times New Roman font, page numbers on all pages except cover page.
- b. Cover Page: Must contain school name, team name, and competition name.
- c. Table of Contents: Must be limited to one page
- d. Length: Must not exceed 15 pages
- e. Professional looking format, clear and easy to understand.
- f. File Name: Must take the form: <School_Name-CM_Plan_2016.pdf>

3.3 Presentation

3.3.1 Purpose of Presentation

The Presentation Phase is an opportunity for teams to communicate to judges and other teams about their design and construction methods. Teams will have the chance to present the process in which their project design had to go through to reach their final end result.

The presentation phase of this competition is essential to professional development as it gives teams a sense of what is to be expected in the professional world when a plan needs to be advertised in comparison to other firms.

3.3.2 Presentation Evaluation

Presentations will be judged based on clarity and content. All sections of the process for this competition should be addressed and elaborated on. It is crucial that teams discuss the advantages and disadvantages encountered throughout the designing of their plan. Presentations will be made the evening prior to the first construction day. This will allow for judges to have an idea of what each team has worked on for a successful build. Furthermore, the presentation will inform judges on each teams construction specifications and expectations of a final build based on the design drawings (See Appendix).

3.3.3 Submission Requirements

Any materials for each teams presentation will need to be submitted with the final plans for the Pathway Rehabilitation due March 18, 2015. This includes PowerPoint slides, or any other props/ files which will be utilized during the presentation.

3.4 Construction

The Construction Phase will take place over two days. Teams will be responsible for all construction processes from site preparation to final finishing work. Construction will be judged based on adherence to the design drawings and construction specifications in addition to safety measures.

4.0 SCORING

Overall scoring will be:

- Design (10 %)
- Final Plan (40 %)
- Presentation (15 %)
- Construction (35 %)

Construction Competition 2016



4.1 Design (10%)

Designs will be scored based on constructability, aesthetics, adherence to specifications, formatting and presentation quality. The document must be submitted by the submission deadline to be considered for the competition.

4.2 Plan Submittals (40% of total score)

Plans will be judged based on adherence to the following categories:
Content and Completeness (%?)

Plans will be scored based on:

- Completeness, having all required elements and sufficient detail to support the construction.
- Technical correctness is the content reasonable and follow industry standards and definitions.

4.3 Presentation Phase (15% of total score)

Teams will be given 15 minutes in a meeting room with the judges and other teams to present their proposed design and construction plan. Teams will be given access to a projector and screen on which to make their presentation. The use of presentation tools (PowerPoint, Prezi, etc.) is highly encouraged. Five (5) minutes will be given for questions. Questions from judges shall be given priority over others.

Teams will be scored based on:

- The completeness and effectiveness of the presentation.
- Adherence to time limits.
- Preparedness for questions.
- Professional conduct.

4.4 Construction Phase (35% of total score)

The Construction Phase consists of the physical work done to create the project.

Parameters:

- Teams will each be given materials based on the plan and the equipment needed to do the construction.
- No construction may take place prior to the competition.
- No outside materials or equipment may be used.
- The number of active team members may be no more than six (6) and no less than two (2) at any time.

Construction Competition 2016

4.4.1 Quality (80 %)

Teams will be judged on how accurately their project follows the design and specifications, as well as their overall quality of construction.

4.4.2. Safety (deductions)

Overall team safety is an absolute priority and teams will be observed for safe practices. All competitors must bring and wear required personal protective equipment (PPE) during the construction phase: hard hats, safety glasses, full-length pants, close-toed shoes (preferably leather or canvas-type material, as running shoes with mesh cover offer little protection from wet concrete), gloves (preferably leather or canvas-type material, which offer better protection than absorbent materials such as cotton), dust masks. Teams will lose points for unsafe behaviors.

4.4.3 Lessons Learned (20 %)

Following construction, each team will give a short, informal oral presentation on site to the judges about lessons learned from the construction phase, including takeaways from the projects and processes that they may have changed. Teams will be scored based on critical thinking and proposed solutions given in the presentation.

5.0 PROJECT TENTATIVE TIMELINE

This project is expected to span a course of eight months and consists of two phases: a design phase and construction phase.

5.1.1 Design Phase

2015	November	23	Request for Qualifications Deadline
		26	Design Specifications Released
	December	-	Design Period
2016	January	31	Design Submittal Due
	February	TBA	Designs Reviewed

Please note that dates are subject to change. Announcements will be made via email if any changes are needed. Sites will be assigned based on a lottery system.

5.1.2 Construction Phase

Due to site limitations, only 5 teams will be able to compete in the construction phase. Team selections will be based on the Design Submittal and judged based on criteria in the Design Specifications.

Construction Competition 2016



2016	February	-	Construction Practice Period
	March	-	Construction Practice Period
	April	TBD	Competition (possible)

A poll will be sent out following the RFQ deadline to find a weekend that works best for participating teams. The construction event will be held in April 2016 at UC Davis. The event is expected to span 2 days.

Please note that dates are subject to change. Announcements will be made via email if any changes are needed.

6.0 MATERIALS

Teams will be given building materials on the day of the competition. Materials may be chosen from the list given in Table 1.

Table 1: Building materials for competition. Prices included for project budget in proposal phase.

Material	Price/Unit	Team Estimate
Concrete	\$6.00/cubic foot	
Aggregate	\$50.00/cubic foot	

Labor Cost: The rate of labor for one team member shall be set as \$20.00 per hour. Intervals of working hours shall be rounded up to the next half-hour. Estimated times for different construction phases are included in Table 2.

Table 2: Estimated time for completion of milestone construction phases.

Tools and Equipment: Teams will be given identical equipment to use during construction, as detailed in Table 3. No additional tools may be used. Teams should identify in their project plan if they believe that any equipment is missing.

Table 3: Available tools and equipment for construction.

Tool	Quantity
Mallet (steel)	1
Measuring Tape (25 ft)	1
Mason Line (225 ft)	1
Level (9 in)	1
Level (48 in)	1
Shovel – Round Point	3

Construction Competition 2016



Shovel - Square	2
Pick	2
Hoe	2
Wheelbarrow	1
Tamper	2
Bow Rake	1
Carpenter Pencil	4
Concrete Trowel	2
Concrete Edger	1
Concrete Groover	1
Screw Driver-Flathead	2
Crowbar	1
Broom - Push	1
Broom - Corn	1
Dust Pan	1
Garbage Bin	1
Rubber Mallets	2
Burlap Sacks	2
Curing Compound	1

7.0 CONTACTS

ASCE UCD will be the host of the 2016 Construction Competition. For any questions, do not hesitate to contact:

Hamza Shallwani

ASCE UCD Construction Project Competition Administrator

shallwani@ucdavis.edu

Harrison Kwan

ASCE UCD President

ucd.asce.president@gmail.com

Score Sheet

Project element	Team Score (1-10, 10 best)	Score X percentage
<u>Design (10%)</u> Section 3.1		
Aesthetics (20 % of design)		
Adherence to Specs (50% of design)		
Presentation quality (30% of design)		
<u>Plan (35%)</u>		
Presentation/Formatting (15% of plan) Section 3.2.6		
Content (45% of plan) Section 3.2.1-3.2.5		
Completeness (40% of plan) Section 4.2		
<u>Construction (40%)</u>		
Quality (80% of construction) Section 4.4.1		
Safety (% deduction) Section 4.4.2		
Lessons learned (20% of Construction) Section 4.4.3		
<u>Presentation (15%)</u> Section 4.3		
Completeness and Effectiveness (50% of presentation)		
Time adherence (15% of presentation)		
Preparedness for Questions (15% of presentation)		
Professional Conduct (20% of presentation)		
TOTAL		

SECTION 02528
CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish and install concrete paving including any incidental work not shown or specified which can be reasonably inferred as part of this work to provide the paving shown on the Drawings.
- B. Work Included
 - 1. Concrete stepping pads
 - 2. Broom finished walkways
 - 3. Integral exposed aggregate pavement
 - 4. Sidewalks per city standard
 - 5. Colored plaza paving
 - 6. Mow band
- C. Related Sections
 - 1. Section 02510: Asphalt Paving

1.2 SYSTEM DESCRIPTION

- A. Concrete shall have a shrinkage not exceeding .05% when tested as per American Society for Testing and Materials (ASTM) C157 (28 days of drying after 7 days of moist curing).
- B. Concrete Work shall be true to line and grade as indicated on the Drawings. Contractor shall be responsible for proper drainage, without bird baths, on all concrete surfaces. Discrepancies or omissions on the Drawings, or conditions on the Project Site which prevent the Contractor from providing proper drainage, shall be brought to the attention of the University's Representative in writing for correction or relief before Work proceeds.
- C. Concrete shall be done by a licensed company with a minimum of 5 years of experience in placing concrete.
- D. Concrete finish shall not deviate more than 1/8" from a line when tested with a 10' straight edge. Thickness deficiency shall not exceed 1/4".

1.3 REFERENCE STANDARDS

- A. Comply with Section 01340: Shop Drawings, Product Data and Samples.

1.4 SUBMITTALS

- A. Furnish manufacturer's product data for curing compounds, metal joints, expansion joint material, test reports, and materials' certifications for concrete and joint fillers and sealers.
- B. Submit 3'-0" x 3'-0" samples of broom & exposed aggregate and colored concrete finishes. Allow time for University's Representative to make adjustments and for resubmittals as required to obtain texture and color approval.

1.4 JOB CONDITION COORDINATION

- A. Traffic Control: Coordinate access for vehicular and pedestrian traffic with University Representative as may be required for other construction activities. Provide flagmen, barricades, warning signs and warning lights as required for safety and traffic control per Section 01530: Barriers and Enclosures.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Forms may be steel or wood or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects.
- B. Joint Dowel Bars: Plain steel bars, ASTM A 615, Grade 40. Cut bars true to length with ends square and free of burrs.
- C. Cement: Type II Portland Cement.
- D. Aggregates: Coarse aggregate for regular weight concrete shall be a maximum of 3/4 inch hard, durable, uncoated, washed, graded, cleaned and screened, crushed rock or gravel conforming to current requirements of ASTM Designation C33.
- E. Integral exposed aggregate will be 3/8" or smaller "Pami Pebbles" or aggregate of equal color and size. The aggregate shall be clean, hard, and durable with uncoated grains free from silt, loam, clay, or other deleterious matter.
- F. Keyed Joints: Keyed joints shall be Burke Key Kold Joints available through the Burke Company, or equal form joint product. Install in concrete paving as indicated on Drawings.

- G. Expansion Joint Materials: Asphalt impregnated 3/8" thick at the face of all structures unless otherwise noted.
- H. Liquid-Membrane Forming Curing Compound: Complying with ASTM C 309, Type I, Class A unless other type acceptable to University's Representative. Moisture loss not more than 0.055 gr./sq. cm. when applied at 200 sq. ft./gal. Curing materials will be a non-pigmented compound applied to the surface of all concrete flatwork.
- J. Water shall be clean potable water.
- K. Color agent:
 - 1. Plaza paving- to match existing plaza paving. Davis Color "Baja Red" #160, 2 lbs. per sack of cement. Submit samples for field match approval by University's Representative.
 - 2. Integral exposed aggregate concrete- Davis Color "Mesquite" #677, 1 lb. per sack of cement. Submit samples for approval by University's Representative.

2.2 CONCRETE MIX, DESIGN AND TESTING

- A. Comply with requirements of Section 03300: Cast-In-Place Concrete and Section 03350: Site Concrete Walls for concrete mix design, sampling and testing, and quality control, and as herein specified.
- B. Design mix to produce normal-weight concrete consisting of Type II Portland Cement and aggregate. Contractor may use high-range water reducing admixture (super-plasticizer), air-entraining admixture and water to produce concrete to facilitate placement with no reduction in compressive strength.
 - 1. Compressive Strength: 3000 PSI, minimum at 28 days.
 - 2. Slump Range: 6" for concrete containing HRWR admixture (super-plasticizer); 4" for concrete without admixture.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

- A. Remove loose material from compacted subbase surface immediately before placing concrete. Proof-roll prepared subbase surface to check for unstable areas and need for additional compaction. Do not begin concrete paving Work until such conditions have been corrected and are ready to receive paving. Obtain approval of the University's Representative.

3.2 FORM CONSTRUCTION

- A. Set forms to required elevation and line, rigidly brace and secure. Install sufficient quantity of forms to allow continuous progress of Work and so that forms can remain in place at least 24 hours after concrete placement. Check completed formwork for elevations and alignment as indicated on plan. Clean forms after each use, and coat with form release agent before reuse to ensure separation from concrete without damage.
- B. Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by University's Representative.

3.3 REINFORCEMENT

- A. Locate, place and support reinforcement and metal joints as indicated in Drawings.

3.4 CONCRETE PLACEMENT

- A. General: Comply with requirements for mixing and placing concrete as herein specified.
 - 1. Do not place concrete until subbase and forms have been checked for line and grade. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
 - 2. Place concrete using methods which prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocation of reinforcing, dowels, and joint devices.
 - 3. Use bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 - 4. Deposit and spread concrete in a continuous operation between transverse joints, as far as possible. If interrupted for more than 1/2 hour, place a construction joint.

3.5 JOINTS

- A. General: Construct expansion, weakened-plane (contraction), and construction joints true-to-line with face perpendicular to surface of concrete. Construct transverse joints at right angles to the centerline, unless otherwise indicated. When joining existing structures, place transverse joints to align with previously placed joints, unless otherwise indicated.

- B. Control (Weakened-Plane, Contraction) Joints: Provide Control joints, sectioning concrete into areas as shown on Drawings. Construct Control joints for a depth equal to at least 1/4 concrete thickness, as follows:
 - 1. Tooled Joints: Form weakened-plane joints in fresh concrete by grooving top portion with a recommended cutting tool and finishing edges with a jointer.
 - 2. Keyed Joints shall be placed on a firm base material adjusted to elevation and alignment.
- C. Construction Joints: No cold joints or construction joints are permitted in flatwork concrete.
- D. Expansion Joints: Install premolded joints with filler as an expansion joint abutting concrete curbs, catch basins, manholes, inlets, structures, walks and other fixed objects indicated.
- E. Fillers and Sealants: Comply with requirements of applicable Section 07900: Joint Sealants for preparation of joints, materials, installation and performance.

3.6 CONCRETE FINISHING

- A. Wood Float Finish:
 - 1. Immediately after darbying concrete surface, refloat with wood hand float to a uniform sandy texture.
 - 2. Finished wood floated surface shall be free from irregularities, depressions and rough spots.
- B. Broom Finish:
 - 1. Draw a stiff bristled broom not less than 18 inches wide across floated concrete surface.
 - 2. Broom perpendicular to direction of walk unless shown otherwise on Drawings.
 - 3. Finished broom surface shall be free from irregularities, depressions and rough spots.
- C. Integral Exposed Aggregate Finish:
 - 1. Evenly expose aggregate by water washing and brushing to maximum depth of 3/32 inch.
 - 2. Avoid pocketing and kicking out aggregate.
 - 3. Finish shall be uniform in color, texture and degree of exposure.
- D. Safety Grooves:
 - 1. Form safety grooves in concrete curb ramps and at top of stairs using a jointer while concrete is still fresh.
 - 2. Cut uniform groove to dimensions and spacing shown on Drawings.
 - 3. Strike grooves before and after brooming.

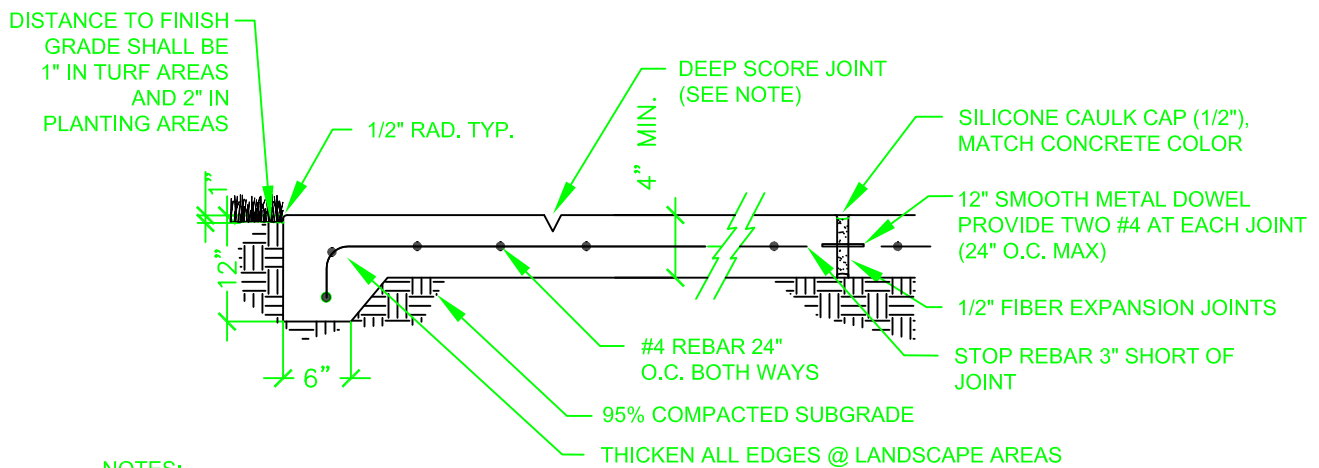
3.7 CURING

- A. Protect and cure finished concrete paving, complying with applicable requirements of Section 03300: Cast-In-Place Concrete. Use membrane-forming curing and sealing compound or approved moist-curing methods.

3.8 REPAIRS AND PROTECTIONS

- A. Repair or replace broken or defective concrete, as directed by University's Representative.
- B. Drill test cores where directed by University's Representative, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.
- C. Protect concrete from damage until acceptance of Work. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Sweep concrete pavement and wash clean of discoloration, dirt and other foreign material just prior to final inspection.

END OF SECTION



NOTES:

1. COMPRESSIVE STRENGTH - MIN. 3,000 PSI
2. FINISH TO BE MED. BROOM FINISH UNLESS OTHERWISE NOTED ON DRAWINGS
3. MIN. CROSS SLOPE ON ALL CONCRETE SURFACES TO BE 1%. MAXIMUM SLOPE 2% UNLESS NOTED OTHERWISE.
4. DEEP SCORE JOINTS TO BE 1/4 DEPTH OF TOTAL CONCRETE THICKNESS. SEE PLAN FOR SCORE JOINT AND EXPANSION JOINT SPACING

December 2, 2015

Additional Specifications

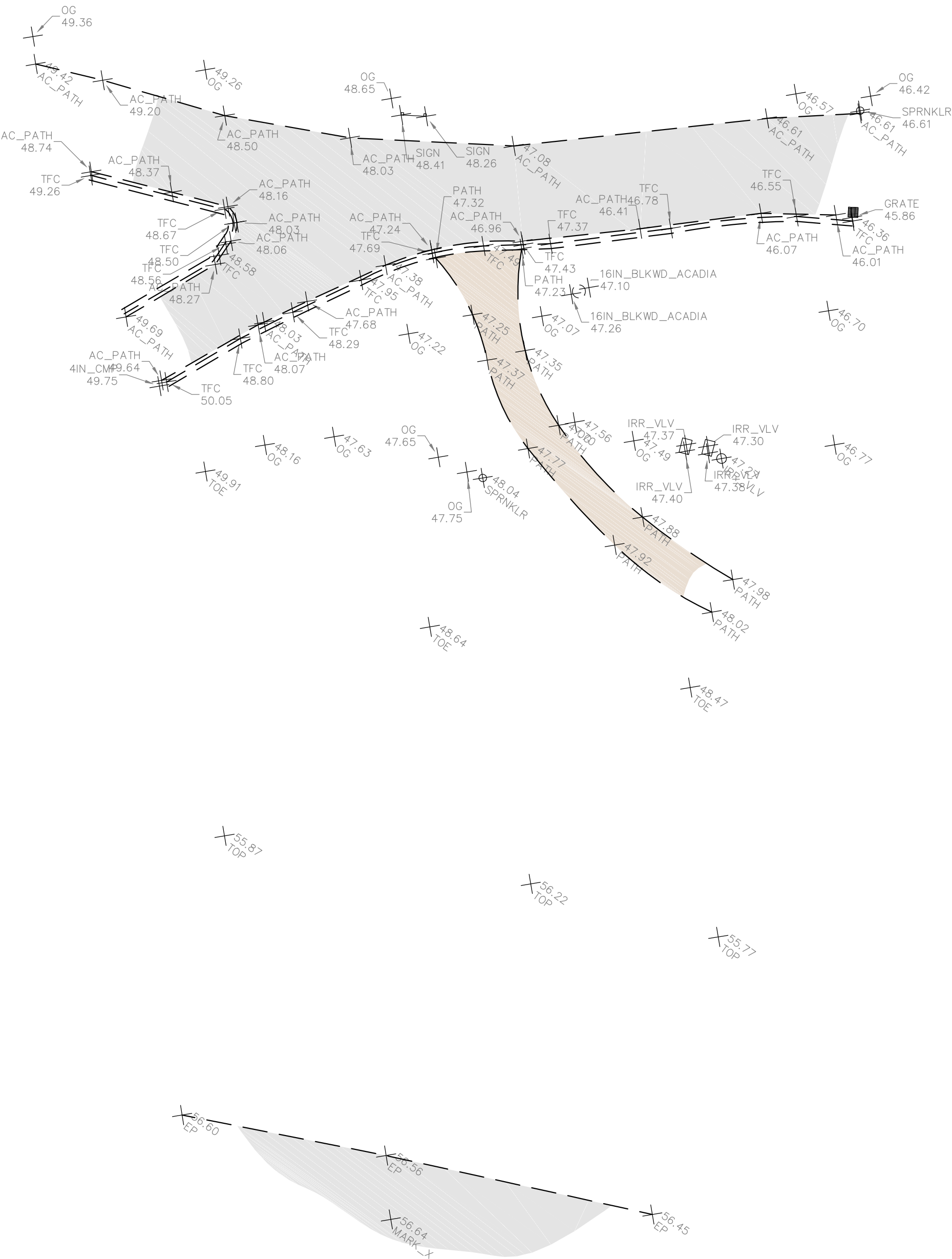
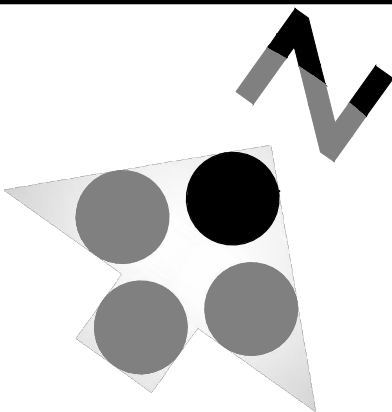
The following specifications are provided by:

- **Skip Mezger**, Campus Landscape Architect.
 - **Emily Griswold**, Director of GATEways Horticulture and Teaching Gardens at the UC Davis Arboretum.
-
- A brown/gold integral color will be added to the concrete mix in order to smoothly transition the freshly poured concrete with the existing decomposed granite paving.
 - The poured concrete must have a medium broom finish.
 - Each team must attain a 2% cross slope and 5% running slope.

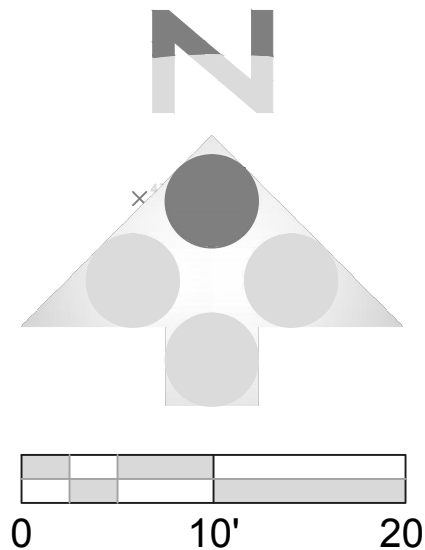
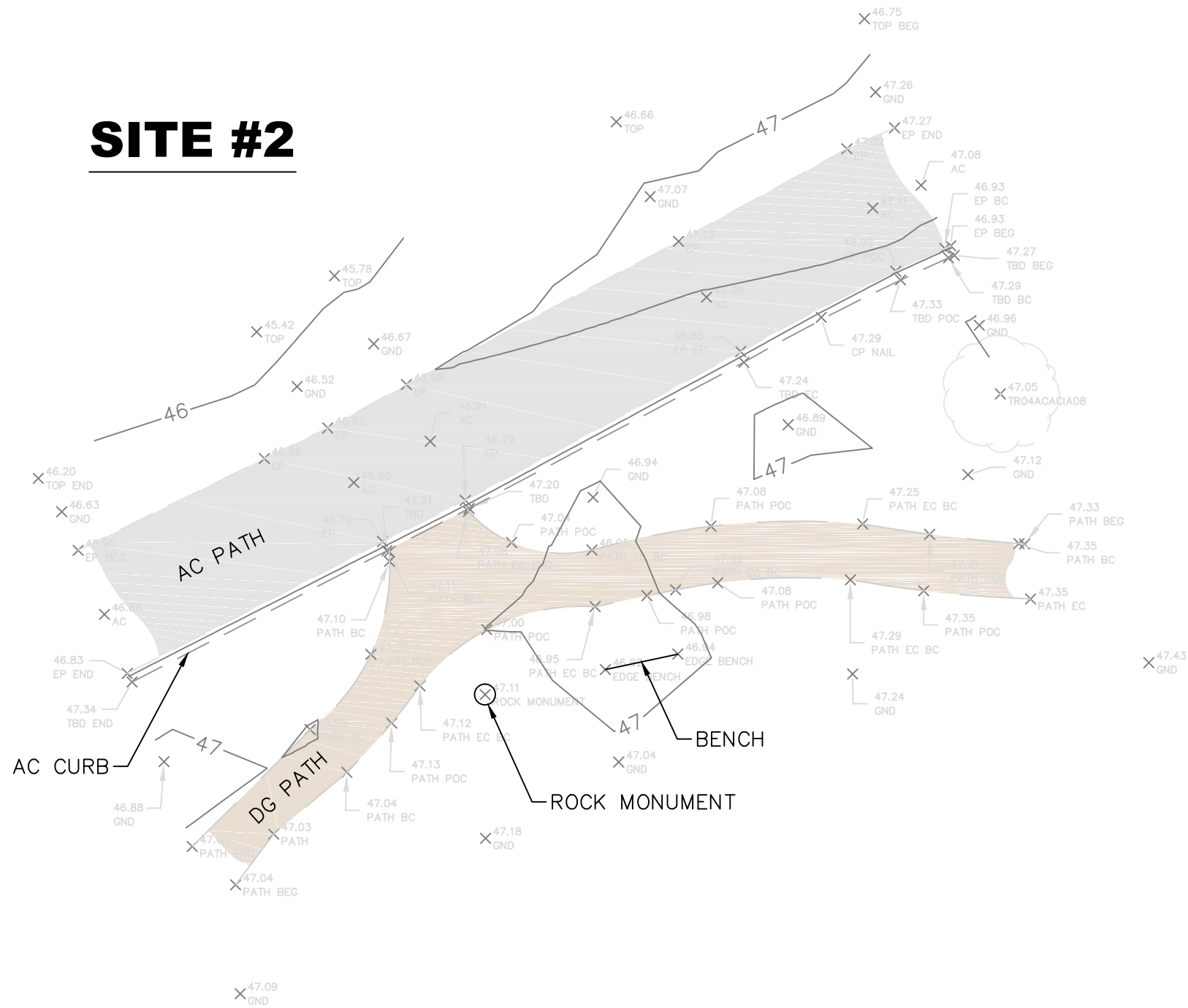


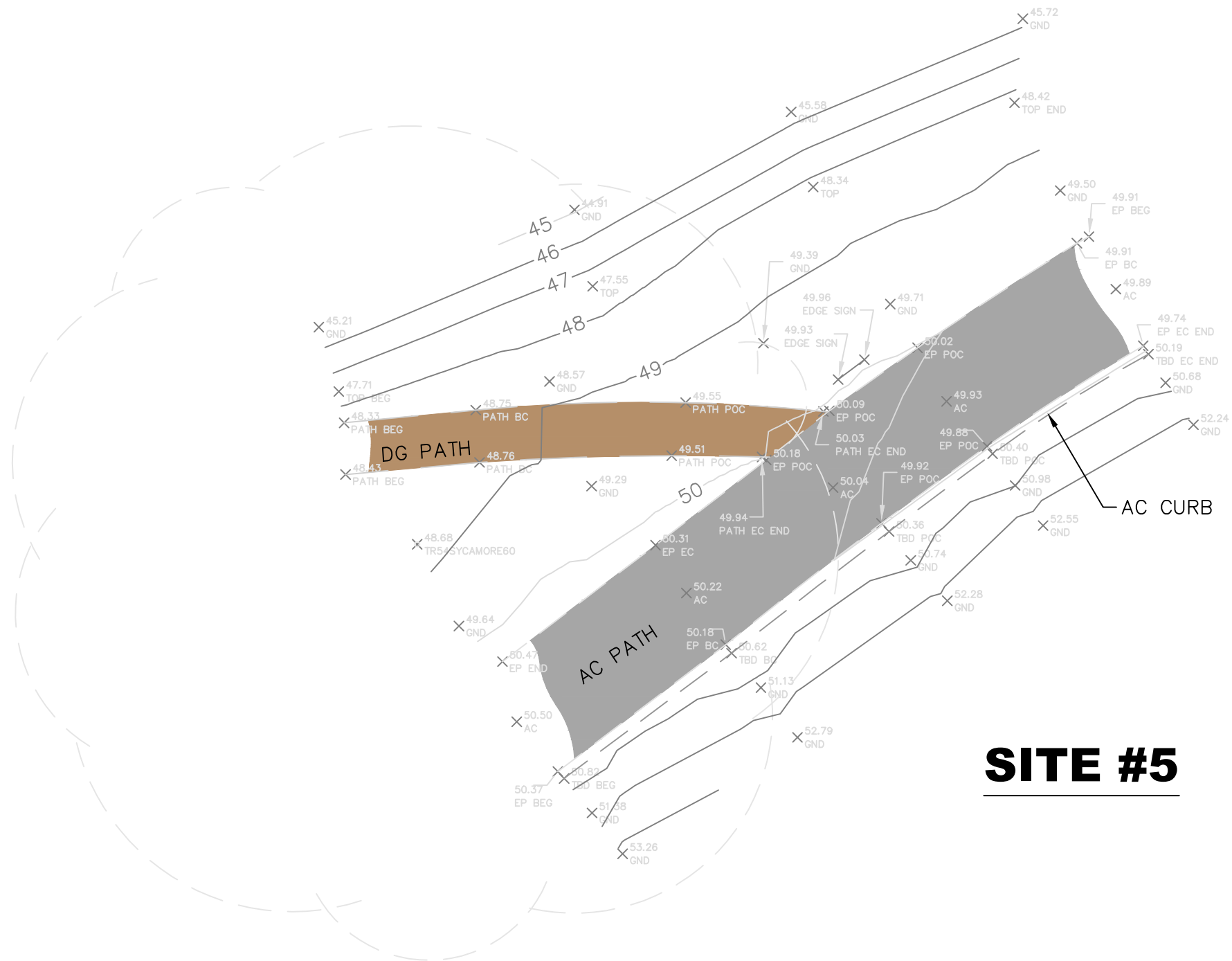
Example of a ramp transitioning the asphalt path to decomposed granite with poured concrete

SITE #1



SITE #2





SITE #5