



# COURSE LAYOUT

# Course Map



# List of Segments

<b>Tunnel Entrance @ T02 .... 13-14</b>	<b>Urban Entrance @ T02 .... 55-56</b>	<b>Cave Entrance @ T02.....93-94</b>
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# How to Use this Guide

## ENVIRONMENTALS



Light/Darkness



Particulates



Water



Mud

Uneven  
Terrain

## TERRAIN



Inclines



Steps/Ledges

Vertical  
ShaftsDynamic  
ObstaclesConstrained  
Passages



# STAGING AREA & STARTING GATE

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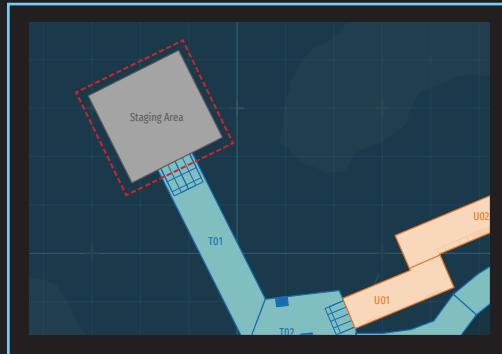
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# Staging Area

The Staging Area represents the one known entrance to an otherwise unknown underground environment. It includes a dedicated area for the Human Supervisor, Pit Crew, and a netted area for deploying UAVs.



## Look and Feel Details

- Aesthetic: Futuristic theme
- 24' square netted area on top of flat level deck
- (2) survey markers embedded into deck
- Black painted deck
- White DARPA SubT Logo in center
- Blue light halo lit decking
- Pit crew area on ground level surrounded by bike rack with branded pillowcases (black background)
- Operator area to be at deck level
- Drone net only above 24'x24' square deck
- Well-lit production lighting

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# Staging Area

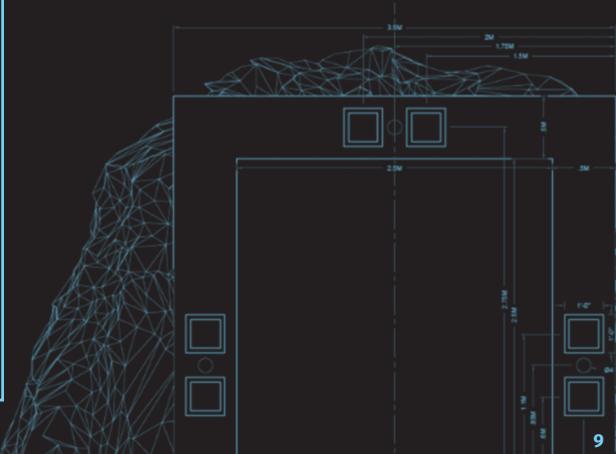
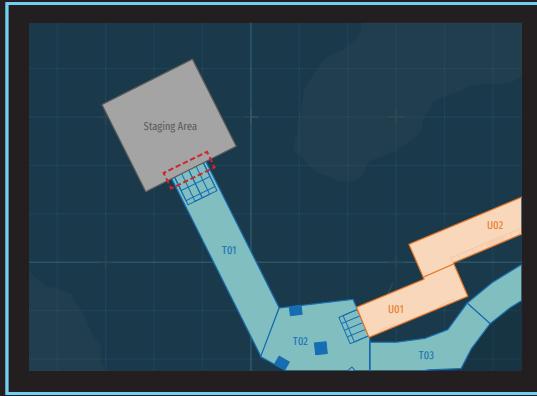


# Starting Gate

The Starting Gate marks the entrance to the competition course. Only robots are permitted to cross the front face of the Starting Gate.

## Look and Feel Details

- Faux rock surround to match venue limestone
- grays, blacks and whites
- Well-lit production lighting



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# Starting Gate





# TUNNEL

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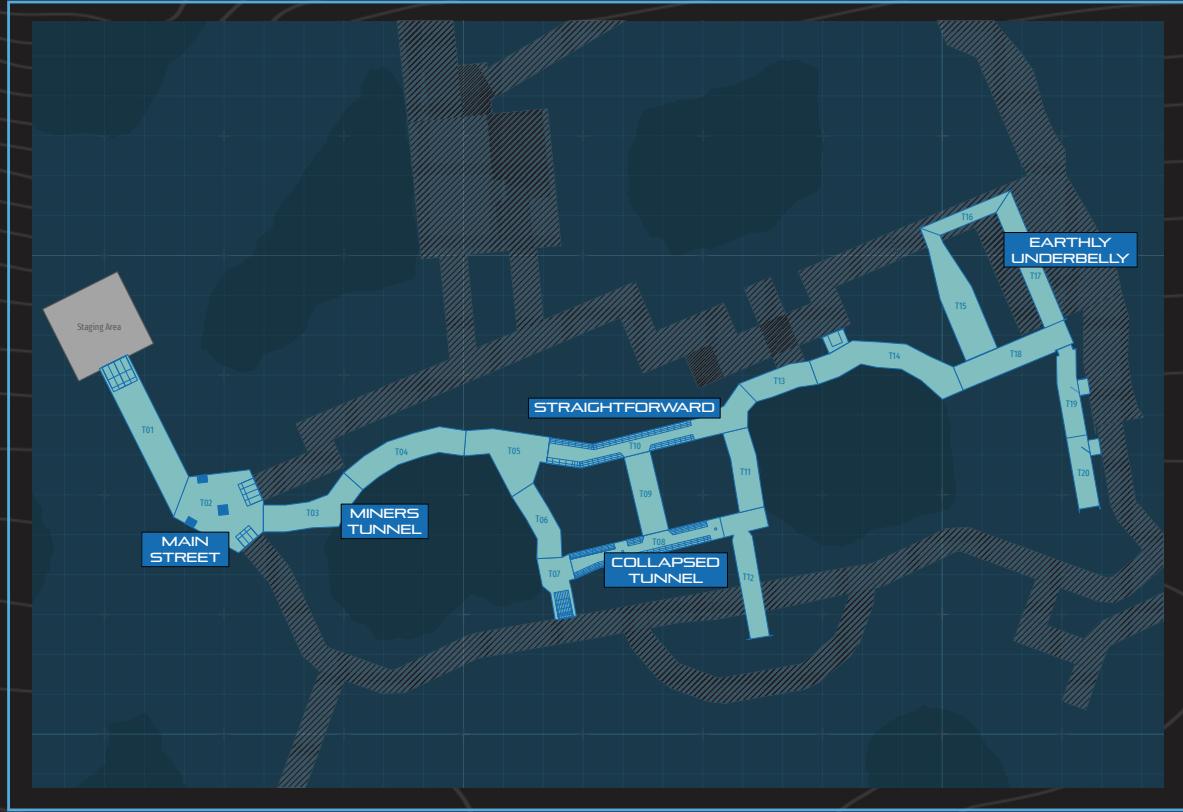
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# Tunnel Entrance @ T02

DIFFICULTY RATING



ENVIRONMENTALS

TERRAIN

GEOMETRY Opening: 7'w x 7'h clearance inside arch



## Look and Feel Details

**Aesthetic:** limestone mining tunnel

**Doorways:** easily movable hinges preferred operationally, single faux steel door

**Structure:** organic shaped blasted opening into limestone earth)

**Lighting:** yellow shop cage string lighting, bulbs every 10lnft, strung off left upper wall of tunnel

## Fabrication Details

- Decking: natural venue terrain, rough, grainy, some loose rocks...NO cart tracks yet
- Walls: theater flats with spray foam scenic treated to look like venue limestone
- Ceiling: hard theater flat wall, with faux limestone crumple fabric

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# Tunnel Entrance @ T02

Virtual Model



Systems Build



# T01: The Descent

The decline into the course immediately sets the tone for teams as they descend into an unknown environment.

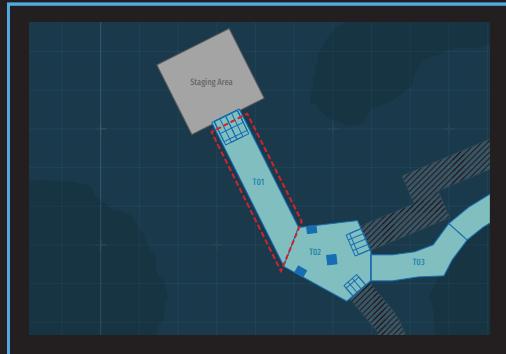
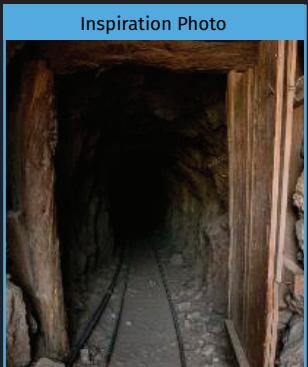
**DIFFICULTY RATING** ■ ■ ■ ■ ■

**ENVIRONMENTALS**

**TERRAIN** 

**GEOMETRY** Opening: ~8'w x 8'h

- Section Length: ~40'



## Terrain Details

raw venue ground, dusty, rocky

## Look and Feel Details

**Aesthetic:** heavy nod to cored out gray/black venue limestone

**Obstacles:** rocks

**Props:** mining signage, shovels, lumber

**Lighting:** well-lit with shop cage lights every 10'

## Fabrication Details

- Decking: none, venue floor no tracks
- Walls: theater flats with carved blasted foam rocks
- Ceiling: hard panels, rocky, netting, support lumber

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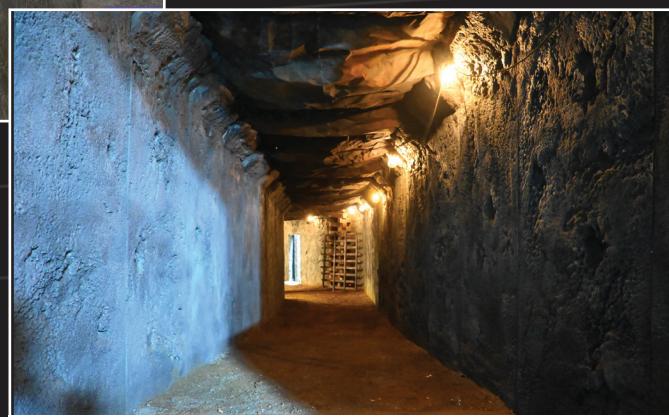
CAVE

# T01: The Descent

Virtual Model



Systems Build



# T02: Main Street

Just around the first corner, teams discover a junction. Decisions here reveal deployment strategies and the subdomains that teams believe their robots are most capable of tackling.

## DIFFICULTY RATING



## ENVIRONMENTALS

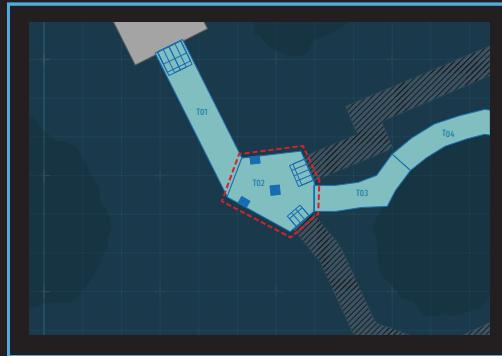
### TERRAIN



### GEOMETRY

Opening: 8'w x 8'h into ~20'w x 8'h  
(vertical brace)

- Section Length: 20'



### Terrain Details

raw venue ground, dusty, rocky

### Look and Feel Details

**Aesthetic:** gray/black limestone, natural lumber, gray cinder block portal surround, bracing, entry portals to each subdomain

**Doorways:** easily movable hinges preferred operationally, single faux steel door

**Obstacles:** wooden crib vertical @ center of room

**Props:** subdomain signage, dented metal doors to tunnel

**Lighting:** well-lit with shop cage lights every 10'

### Fabrication Details

- Decking: none
- Walls: theater flats with foam scenic rocks, jacks... central support leg vertical
- Ceiling: soft, netting, textured limestone ribbing

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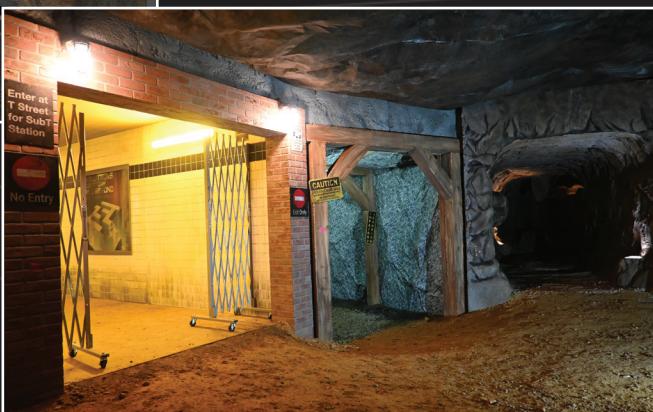
TUNNEL

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CAVE

# T02: Main Street

Virtual Model



Systems Build

# T03: Pillar's Entrance

Overhead LED lighting, wood bracing, and natural rock faces bring to mind a combination of visual cues from across the test environments at STIX (Edgar) and Tunnel Circuit (NIOSH).

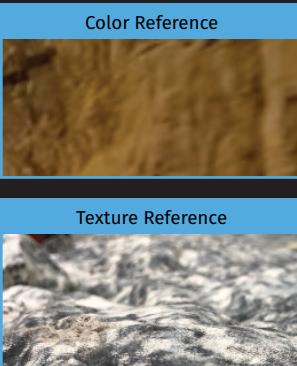
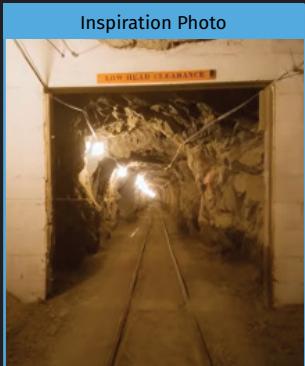
**DIFFICULTY RATING** 

## ENVIRONMENTALS

## TERRAIN

**GEOMETRY** Opening: 8'w x 8'h into 6'w sections in places

- Section Length: ~25'



## Terrain Details

venue ground, supplemental aggregate, rocks, no tracks yet

## Look and Feel Details

**Aesthetic:** heavy nod to cored out limestone, natural lumber bracing, raw dusty rocky dirt terrain

**Obstacles:** begin almost fully buried mining tracks down center

**Props:** subdomain signage, small mining equipment

**Lighting:** well-lit with white rope light strings

## Fabrication Details

- Decking: none
- Walls: theater flats with printed molding fabric shaped
- Ceiling: hard panels, rocky, netting, support lumber

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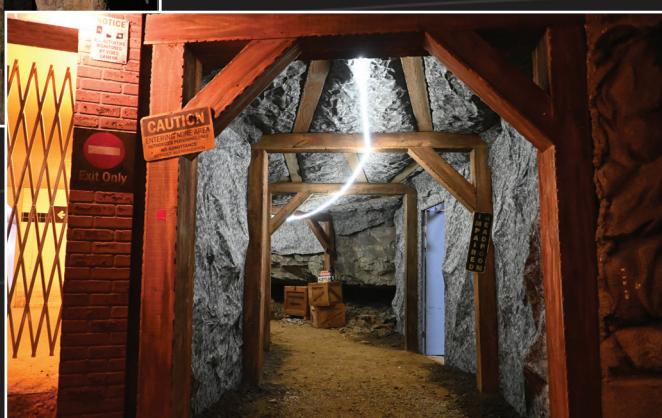
CAVE

# T03: Pillar's Entrance

Virtual Model



Systems Build



# T04: Stone's Chisel

The mostly flat section begins to introduce more obstacles and complexity as the robots begin to explore the tunnel subdomain.

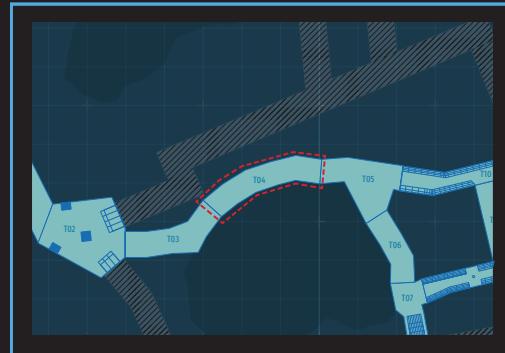
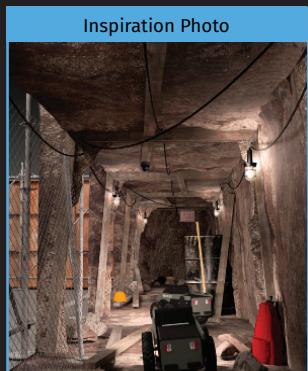
**DIFFICULTY RATING** 

**ENVIRONMENTALS**

**TERRAIN** 

**GEOMETRY** Opening: 6-8'w x 6-8'h

- Section Length: ~40'



## Terrain Details

venue ground, supplemental rocks, no tracks yet

## Look and Feel Details

**Aesthetic:** natural & chiseled limestone

**Obstacles:** semi-buried mining tracks down center

**Props:** lumber, miner's equipment, boulder, fencing

**Lighting:** well-lit with white rope light strings

## Fabrication Details

- Decking: none
- Walls: venue pillar + theater flats, overhead bracing, soft crumple fabric, corrugated paneling
- Ceiling: horizontal joists, soft, netting

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# T04: Stone's Chisel

Virtual Model



Systems Build



# T05: Barrels Row

The first intersection in the tunnel subdomain and the beginning of mostly-buried rails. Teams that continue forward may indicate a confidence in traversing rails.

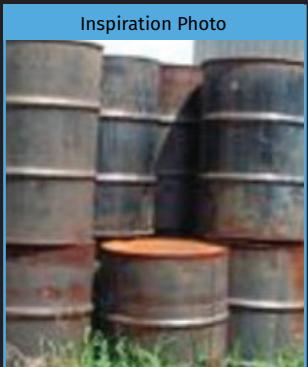
**DIFFICULTY RATING** 

**ENVIRONMENTALS** 

**TERRAIN** 

**GEOMETRY** Opening: 7-8'w x 6-8'h

- Section Length: ~20'



## Terrain Details

venue ground, supplemental aggregate, start cart tracks buried in dirt into T10

## Look and Feel Details

**Aesthetic:** heavy nod to cored out limestone

**Obstacles:** fair 5'+ constraint & semi-buried mining tracks down center

**Props:** stacked line of barrels at triangle

**Lighting:** partially lit with shop cage lights every 10'

## Fabrication Details

- Decking: none
- Walls: venue pillar + theater flats, overhead bracing, soft crumple fabric
- Ceiling: horizontal joists, soft, netting

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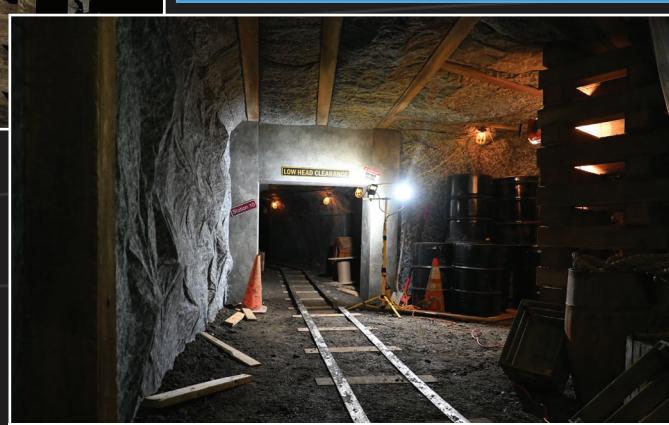
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# T05: Barrels Row

Virtual Model



Systems Build



# T06: Rough Cut

Teams that decided to avoid rails will instead experience a falling dynamic obstacle made of rocks and wooden beams. There's no turning back now.

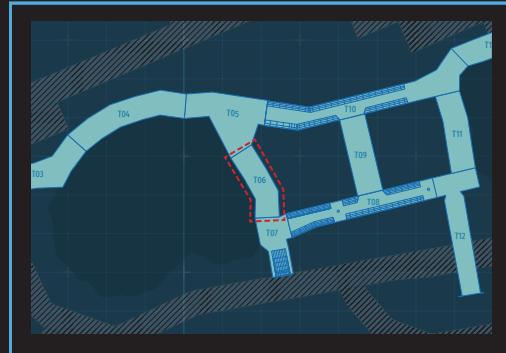
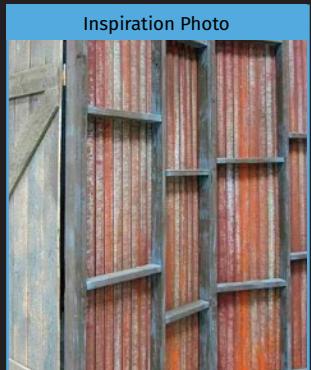
**DIFFICULTY RATING** ■ ■ ■ ■ ■

**ENVIRONMENTALS**

**TERRAIN**

**GEOMETRY** Opening: 6-8'w x 6-8'h

- Section Length: ~20'



## Terrain Details

venue ground, supplemental aggregate, no cart tracks

## Look and Feel Details

**Aesthetic:** heavy nod to cored out limestone

**Obstacles:** dirt/rock pile off pillar, metal pipes

**Props:** bundles of metal pipes

**Lighting:** partially lit with shop cage lights every 10'

## Fabrication Details

- Decking: none
- Walls: venue pillar + theater flats, overhead bracing, faux dented rusty steel panels
- Ceiling: horizontal joists, soft, netting

TUNNEL

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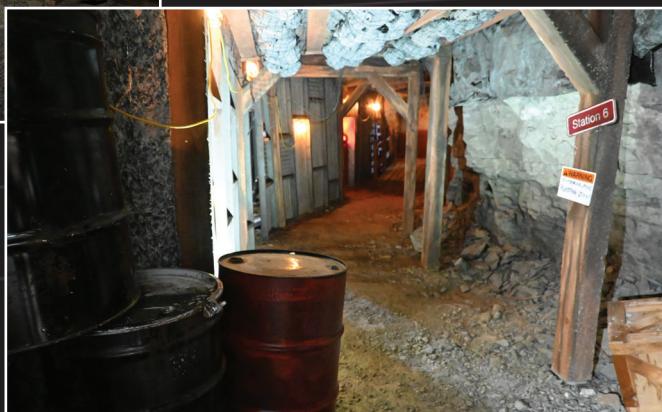
CAVE

# T06: Rough Cut

Virtual Model



Systems Build



# T07: Covered Bridge

The constrained passage and wooden bridge are both throwbacks to course features from Tunnel Circuit that teams struggled with. The bridge also connects the tunnel and cave subdomains.

## DIFFICULTY RATING



## ENVIRONMENTALS



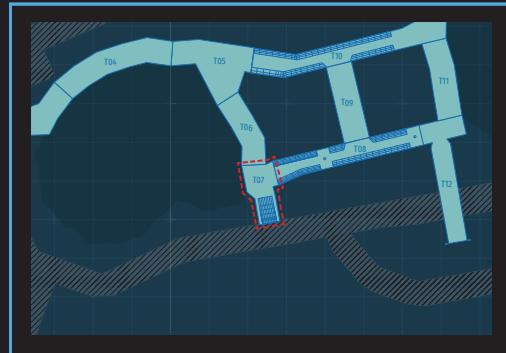
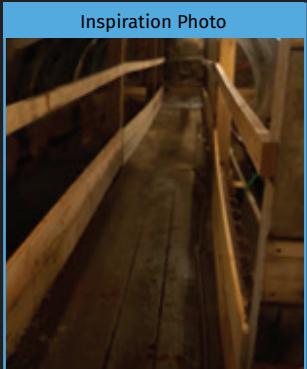
## TERRAIN



## GEOMETRY

Opening: ~5'w x 6'h

- Section Length: ~15'



## Terrain Details

venue ground, lumber ramp/railings, no tracks

## Look and Feel Details

**Aesthetic:** brown lumber in gray cored out earth

**Obstacles:** constrained footbridge into natural cave

**Props:** subdomain signage

**Lighting:** partially lit with shop cage lights every 10'

## Fabrication Details

- Decking: none
- Walls: venue pillar + theater flats with jaxsan finish, bracing, rough textured painted wall
- Ceiling: horizontal joists, soft, netting & molding cloth

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# T07: Covered Bridge

Virtual Model



LOW HEAD CLEARANCE

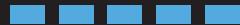
Systems Build



# T08: Is This Safe?

Constrained passages with ground, wall, and ceiling obstacles present challenges for UAVs and larger platforms alike. The rotating red lighting and low lighting sets the tone for this difficult passage.

**DIFFICULTY RATING**



**ENVIRONMENTALS** ⚡

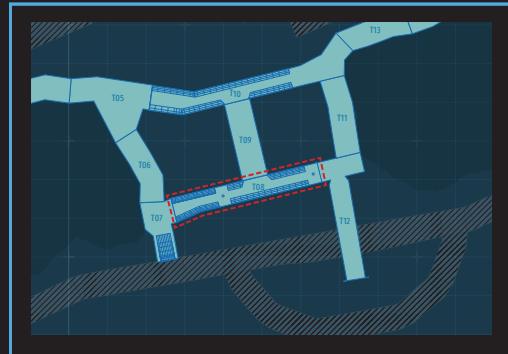
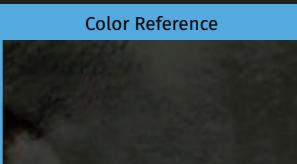
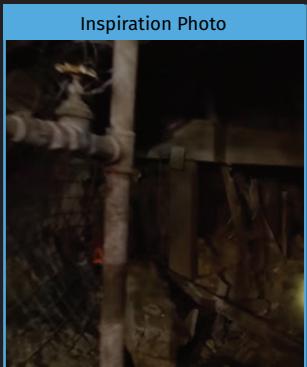


**TERRAIN** 🏜️



**GEOMETRY** Opening: ~4-6'w x 5'h

- Section Length: ~40'



## Terrain Details

venue ground, supplemental aggregate

## Look and Feel Details

**Aesthetic:** poor gray concrete job, failing lumber/pipes

**Obstacles:** vertical pipes & joists; additional constrained passageway closer in framed with lumber and filled with debris

**Props:** large hoses, lumber, pipes

**Lighting:** poorly-lit. (2) Red Siren Lights

## Fabrication Details

- Decking: none
- Walls: venue pillar + theater flats, overhead bracing, rough textured painted wall pulp art with jaxsan
- Ceiling: hard panels, rocky, netting, support lumber, pulp art with jaxsan

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# T08: Is This Safe?

Virtual Model



Systems Build



# T09: Big Thunder

Side passages and storage rooms are often littered with supplies and debris. The maze-like section made up of T05-T12 also presents loop closure opportunities for mapping.

## DIFFICULTY RATING



## ENVIRONMENTALS



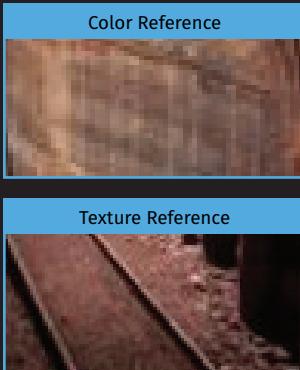
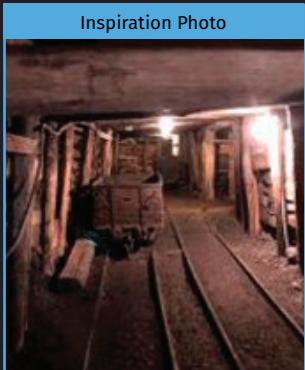
## TERRAIN



## GEOMETRY

Opening: 6'w x 6'h

- Section Length: ~20'



## Terrain Details

venue ground, supplemental aggregate, no cart tracks

## Look and Feel Details

**Aesthetic:** brown lumber, blasted limestone

**Obstacles:** mining cart & tracks, props

**Props:** mining cart, lumber, gear

**Lighting:** dimly lit with shop cage lights every 10'

## Fabrication Details

- Decking: none
- Walls: venue pillar + theater flats, overhead bracing, rough textured painted wall
- Ceiling: hard panels, lumber joists

TUNNEL

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CAVE

# T09: Big Thunder

Virtual Model



Systems Build



# T10: Straightforward

The rails get progressively more difficult, ending with completely unburied rails and beams. Rails are consistently a significant challenge for all ground mobility platform types.

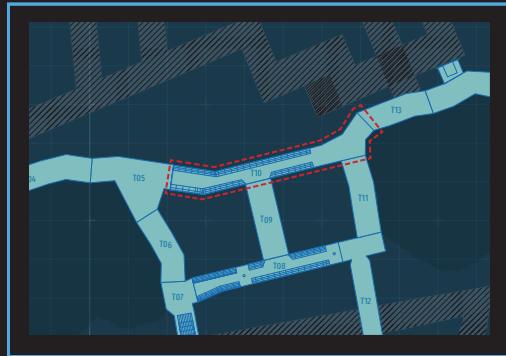
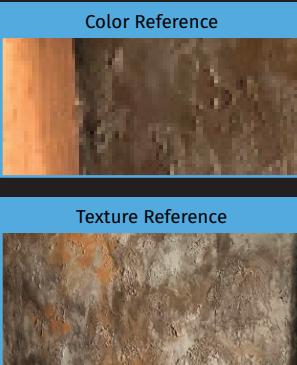
**DIFFICULTY RATING** ■ ■ ■ ■ ■

**ENVIRONMENTALS** ☀️

**TERRAIN** ☁️

**GEOMETRY** Opening: 6'w x 6'h

- Section Length: ~35'



## Terrain Details

venue ground, supplemental aggregate, cart tracks more exposed

## Look and Feel Details

**Aesthetic:** brown lumber, brown/sandy earth

**Obstacles:** semi-buried mining tracks down center

**Props:** medium sized 'mining gear'

**Lighting:** partially lit with shop cage lights every 10'

## Fabrication Details

- Decking: none
- Walls: venue pillar + theater flats, overhead bracing, rough textured painted wall
- Ceiling: hard panels, rocky, netting, support lumber

TUNNEL

URBAN

CAVE

TUNNEL

URBAN

CAVE

# T10: Straightforward

Virtual Model

LOW HEAD CLEARANCE



Systems Build



# T11: The Crossing

The natural rock fall on one side and props/debris on the other side give this section multiple ways to trip up robots.

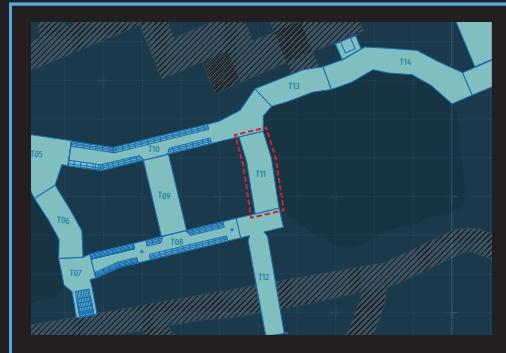
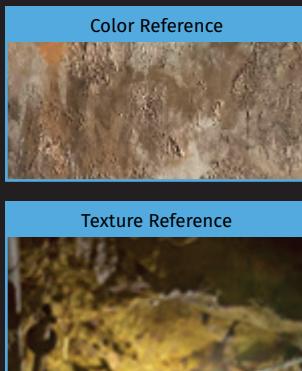
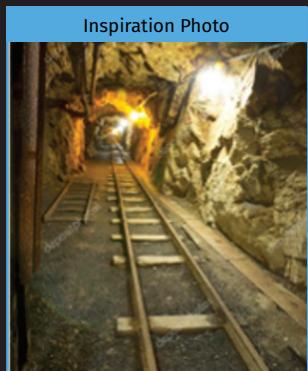
**DIFFICULTY RATING** 

**ENVIRONMENTALS** 

**TERRAIN** 

**GEOMETRY** Opening: 6-8'w x 8'h

- Section Length: ~35'



## Terrain Details

venue ground, supplemental aggregate, particle track pieces

## Look and Feel Details

**Aesthetic:** heavy nod to cored out limestone

**Obstacles:** fully exposed mining tracks on right side, loose steel

**Props:** rusty pipes, gear, loose cart tracks

**Lighting:** dimly lit with shop cage lights every 10'

## Fabrication Details

- Decking: none
- Walls: venue pillar + theater flats, overhead bracing, rough textured painted wall, jaxsan finish
- Ceiling: horizontal joists, soft, netting, molding cloth

TUNNEL

URBAN

CAVE

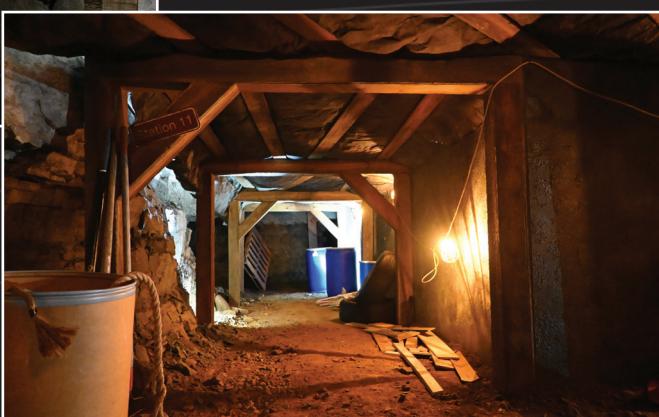
TUNNEL

URBAN

CAVE

# T11: The Crossing

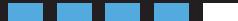
Virtual Model



Systems Build

# T12: The Hideout

The rockpile at this dead-end gives the appearance of a mine collapse and marks the end of the tunnel section that passes under the cave overpass.

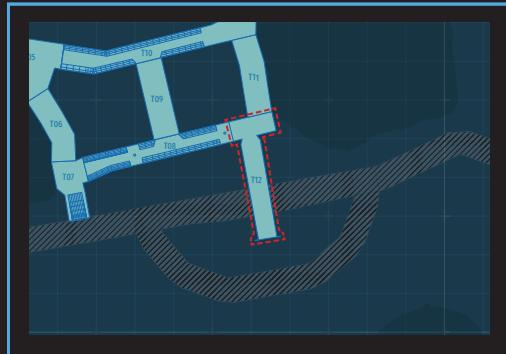
**DIFFICULTY RATING** 

**ENVIRONMENTALS** ⚡ 

**TERRAIN** 

**GEOMETRY** Opening: 5-8'w x 6'h

- Section Length: ~30'



## Terrain Details

venue ground, no tracks

## Look and Feel Details

**Aesthetic:** tunnel collapse, crushed/toppled end used for storage

**Obstacles:** loose odds and ends

**Props:** storage items, lumber, buckets

**Lighting:** dimly lit with shop cage lights every 10'

## Fabrication Details

- Decking: none
- Walls: theater flats, overhead bracing, rough textured painted wall, jaxsan
- Ceiling: soft, netted rocks, tunnel collapse, molding cloth

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TUNNEL

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CAVE

# T12: The Hideout

Virtual Model



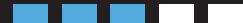
Systems Build



# T13: The Laydown

As teams progress into the back half of the tunnel subdomain they are met with more obstacles, increasingly difficult terrain, and lower lighting.

## DIFFICULTY RATING



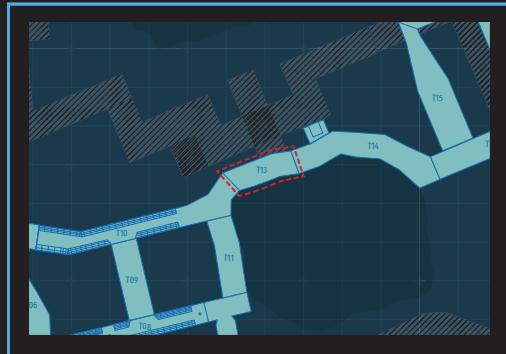
## ENVIRONMENTALS



## TERRAIN

**GEOMETRY** Opening: 6-8'w x 6-8'h

- Section Length: ~40'



## Terrain Details

venue ground, supplemental aggregate, no cart tracks

## Look and Feel Details

**Aesthetic:** gray/black limestone

**Obstacles:** semi-buried mining tracks down center, tracks stop at end, no stopper

**Props:** mining gear/equipment, wooden crates

**Lighting:** dimly lit with shop cage lights every 10'

## Fabrication Details

- Decking: none
- Walls: venue pillar + theater flats, overhead bracing, rough textured painted wall, jaxsan
- Ceiling: horizontal joists, soft, netting, molding cloth

TUNNEL

URBAN

CAVE

TUNNEL

URBAN

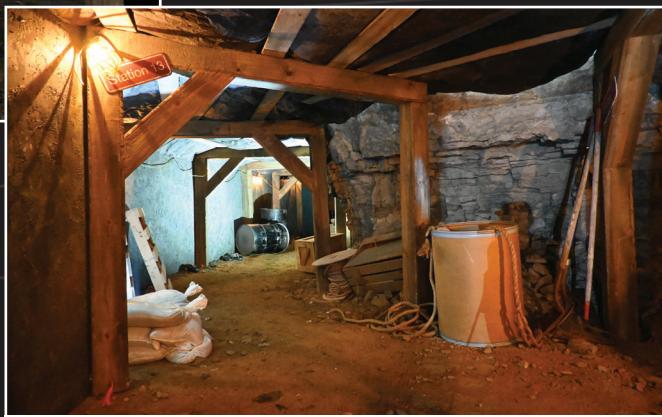
CAVE

# T13: The Laydown

Virtual Model



Systems Build



# T14: Tarp City

A throwback to the tarps used in previous events, teams may think the tarp in this section will be removed in later runs to open up a new area to explore, but they would be wrong.

## DIFFICULTY RATING



## ENVIRONMENTALS

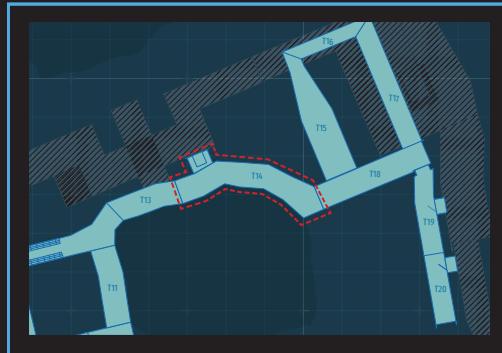
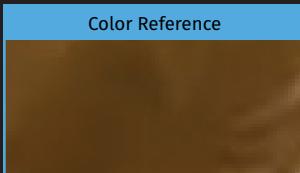
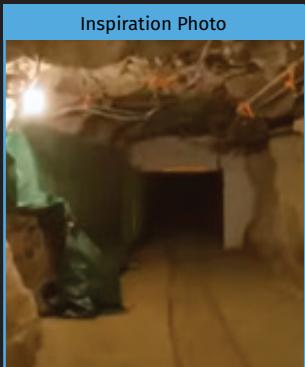


## TERRAIN

### GEOMETRY

Opening: 6-7'w x 6'h

- Section Length: ~30'



## Terrain Details

venue ground, supplemental aggregate, no tracks

## Look and Feel Details

**Aesthetic:** gray/black limestone, partial coring, tarp/orange net coverings

**Obstacles:** constrained doorway into dark part

**Add:** false portal, guywire, carabiners

**Props:** tarps

**Lighting:** dimly lit with shop cage lights every 10'

## Fabrication Details

- Decking: none
- Walls: venue pillar + theater flats, overhead bracing, rough textured painted wall, jaxsan
- Ceiling: horizontal joists, soft, netting, molding cloth

TUNNEL

URBAN

CAVE

TUNNEL

URBAN

CAVE

# T14: Tarp City

Virtual Model

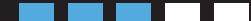


Systems Build



# T15: Willy Wonka

The gradually compressing cross-section is deceptively constraining. This passage leads to the underpass that goes under the urban metro platform.

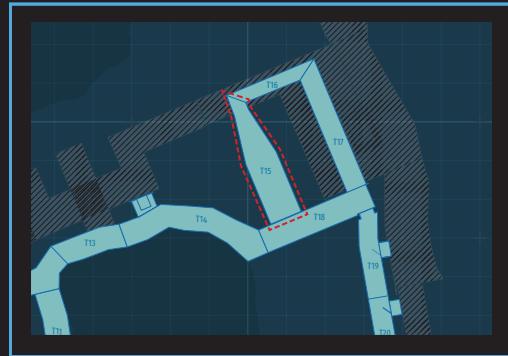
**DIFFICULTY RATING** 

**ENVIRONMENTALS** ⚡ 

**TERRAIN** 🏔

**GEOMETRY** Opening: 6-7'w x 6'h down to ~4'w x 4'h min

- Section Length: ~30'



## Terrain Details

venue ground, no tracks

## Look and Feel Details

**Aesthetic:** black/gray limestone, cagey

**Obstacles:** a tightening room

**Props:** caging, boulder

**Lighting:** dimly lit with shop cage lights every 10'

## Fabrication Details

- Decking: none
- Walls: theater flats with jack legs, jaxsan textured paint or cloth
- Ceiling: soft, dark, 'caged rocks', molding cloth

TUNNEL

URBAN

CAVE

TUNNEL

URBAN

CAVE

# T15: Willy Wonka

Virtual Model



Systems Build

# T16-17: Underbelly

Passing under the urban metro platform, this constrained passage can be seen from above through a grate - a throwback to a grate in the STIX competition course at the Edgar Mine.

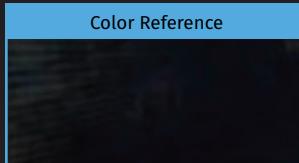
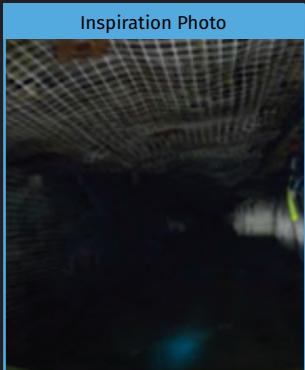
**DIFFICULTY RATING** 

**ENVIRONMENTALS** ⚡ ☁️ 🐸

**TERRAIN** ↗

**GEOMETRY** Opening: min 4'w x 4'h

- Section Length: ~60'



## Terrain Details

venue ground

## Look and Feel Details

**Aesthetic:** dark underworld, haunted house

**Obstacles:** constrained

**Props:** Barrels, Paint Cans, Wooden Boards

**Lighting:** none

## Fabrication Details

- Decking: none
- Walls: cladded staging, black painted, white netting, rock bolt plates
- Ceiling: lumber decking of stage

TUNNEL

URBAN

CAVE

TUNNEL

URBAN

CAVE

# T16-17: Underbelly

Virtual Model



Systems Build



# T18: Problem Pallets

The obstacles in this section include not just ground protrusions but also ceiling obstacles that would trip up most UAVs.

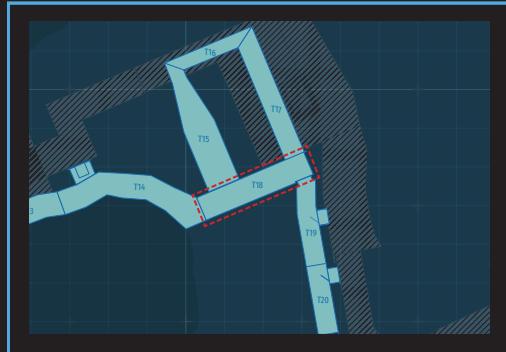
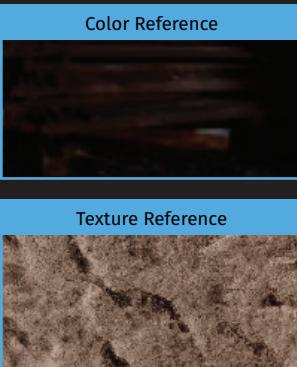
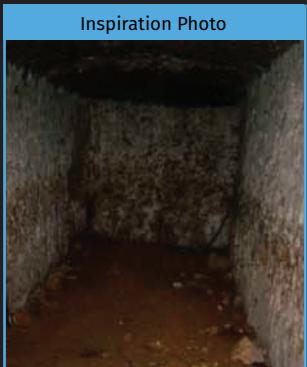
**DIFFICULTY RATING** 

**ENVIRONMENTALS** ⚡ 🧠 🎭

**TERRAIN**

**GEOMETRY** Opening: 8'w x 6-8'h

- Section Length: ~30'



## Terrain Details

venue ground, no tracks

## Look and Feel Details

**Aesthetic:** wet-looking gray/black concrete rock

**Obstacles:** small pallets of gear, hanging tarp swags

**Props:** subdomain signage, pallets, plastic, piping

**Lighting:** dimly lit with shop cage lights every 10'

## Fabrication Details

- Decking: none
- Walls: theater flats with jack legs, pulp art textures
- Ceiling: hard, pulp art textures

TUNNEL

URBAN

CAVE

TUNNEL

URBAN

CAVE

# T18: Problem Pallets

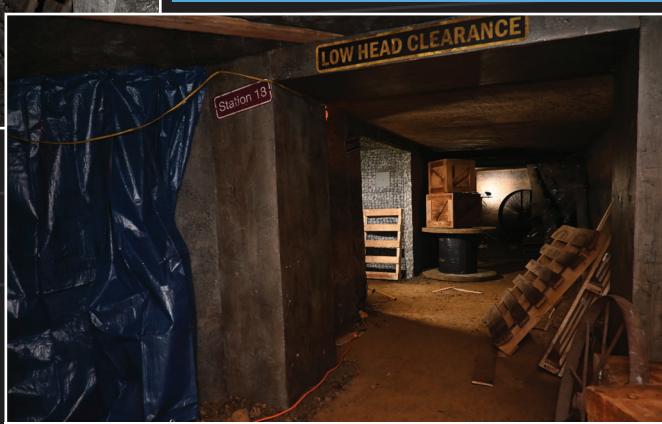
Virtual Model



LOW HEAD CLEARANCE

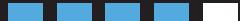
Station 18

Systems Build



# T19: Grand Central

This passage includes a connection point to the urban subdomain, but robots will have to navigate the rough terrain, metal pipes, and low lighting to get there.

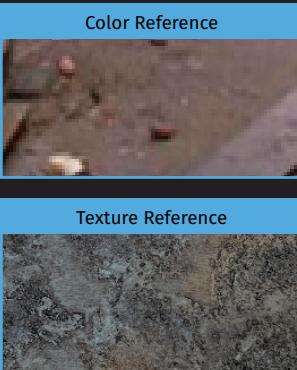
**DIFFICULTY RATING** 

**ENVIRONMENTALS** ⚡  

**TERRAIN** 

**GEOMETRY** Opening: 6'w x 6'h

- Section Length: ~50'



## Terrain Details

venue ground, no tracks

## Look and Feel Details

**Aesthetic:** wet-looking, cement covered limestone

**Obstacles:** ground debris

**Props:** construction debris, scaffold remnants

**Lighting:** well-lit with white rope light strings

## Fabrication Details

- Decking: none
- Walls: theater flats with jack legs, jaxsan foamy concrete texture
- Ceiling: hard, jaxsan foamy concrete texture

TUNNEL

URBAN

CAVE

TUNNEL

URBAN

CAVE

# T19: Grand Central

Virtual Model



Systems Build



# T20: Power Move

This passage includes a connection point to the cave subdomain and marks the end of the back half of the tunnel subdomain.

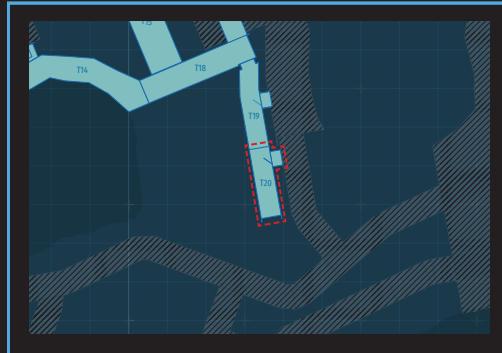
**DIFFICULTY RATING** 

**ENVIRONMENTALS** ⚡  

**TERRAIN** 

**GEOMETRY** Opening: 6'w x 6'h

- Section Length: ~20'



## Terrain Details

venue ground, no tracks

## Look and Feel Details

**Aesthetic:** wet-looking, cement covered limestone, leading into natural cave

**Obstacles:** large protruding equipment

**Props:** 'electrical gear', cables

**Lighting:** well-lit with white rope light strings (Blinking green light)

## Fabrication Details

- Decking: none
- Walls: theater flats with jack legs, jaxsan foamy concrete texture
- Ceiling: hard, jaxsan foamy concrete texture

TUNNEL

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CAVE

TUNNEL

URBAN

CAVE

# T20: Power Move

Virtual Model



Systems Build





DARPA  
SUBTERRANEAN  
CHALLENGE  
**FINALS**

# URBAZ

TUNNEL

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CAVE

TUNNEL

URBAN

CAVE



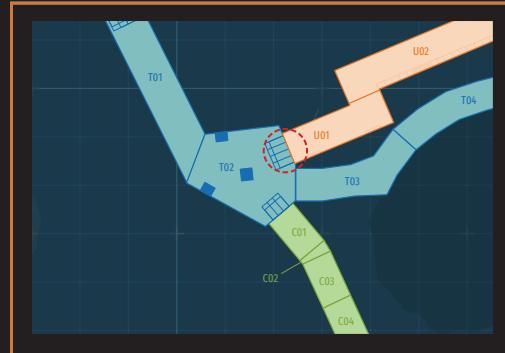
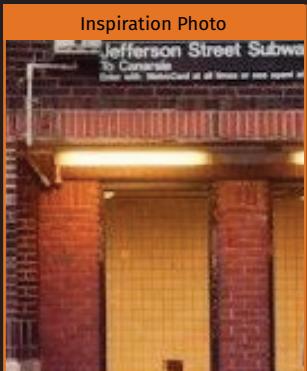
# Urban Entrance @ T02

**DIFFICULTY RATING** 

**ENVIRONMENTALS**

**TERRAIN**

**GEOMETRY** Opening: 7'w x 7'h clearance inside arch



## Look and Feel Details

**Aesthetic:** neglected city infrastructure

**Doorways:** easily movable hinges preferred operationally, plywood/barricade

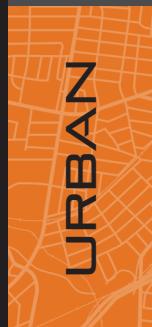
**Structure:** rigid defined archway cladded in faux concrete footer, red bricks, signage, etc.

**Lighting:** (2) armed globe sconces on faces of arch verticals

## Fabrication Details

- Decking: flat faux concrete with ramp up to deck level 13" off the ground behind arch, ramp to start in front of arch, incline through it and end at the back face of the arch
- Walls: after archway to be theater flats with scenic distressed subway tile
- Ceiling: dark colored, soft fabric ceiling overhead in front of arch, dark solid gray soft fabric ceiling overhead behind arch

TUNNEL



CAVE

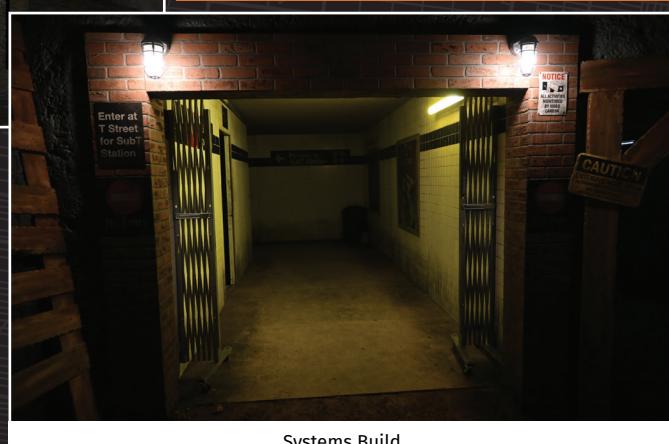
TUNNEL

URBAN

CAVE

# Urban Entrance @ T02

Virtual Model



Systems Build

# U01: Pedway Entrée

The entrance to the Urban course sets the tone with a distinctly urban metro aesthetic that may seem inviting, but belies the challenges ahead.

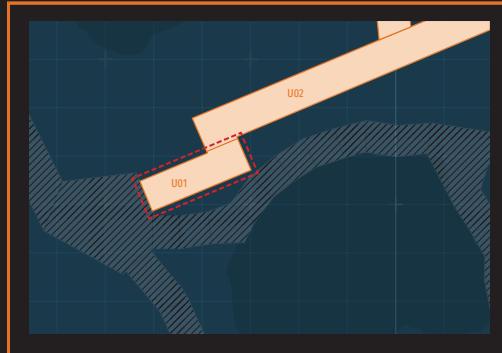
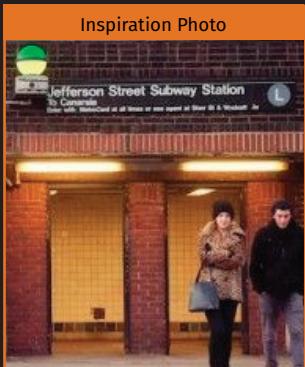
**DIFFICULTY RATING**    

## ENVIRONMENTALS

## TERRAIN

**GEOMETRY** Opening: ~7'w x 7'h

- Section Length: ~20'



## Terrain Details

flat, faux concrete

## Look and Feel Details

**Aesthetic:** underground subway entrance/pedway

**Obstacles:** trash can, engineer's cart

**Props:** signage, lighting, ads, trashcan

**Lighting:** linear LED tube lights every 25'+

## Fabrication Details

- Decking: ~12"+h scaffold floor
- Walls: theater flats, with subway tile, black stripe 6,7 tiles from top
- Ceiling: dark solid gray soft fabric

TUNNEL

URBAN

CAVE

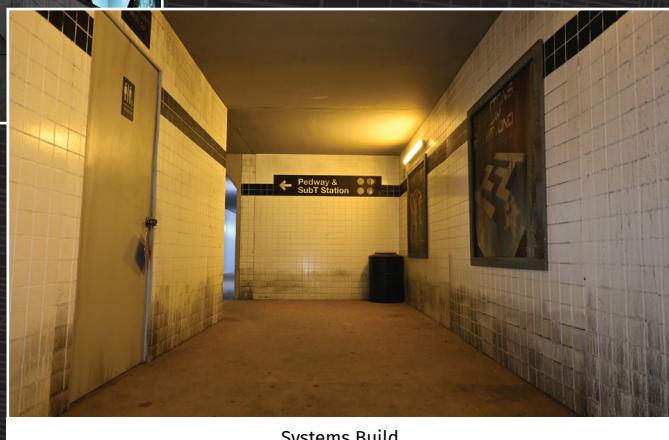
TUNNEL

URBAN

CAVE

# U01: Pedway Entrée

Virtual Model



Systems Build

# U02: A Grey Area

This long featureless hallway is designed to trip up perception algorithms that rely too heavily on feature tracking, leading to drift and errors in the teams' maps.

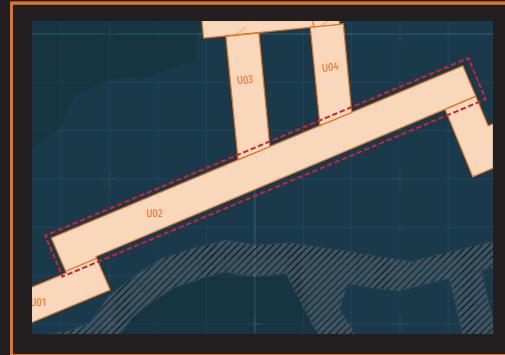
**DIFFICULTY RATING** ■ ■ ■ ■ ■

**ENVIRONMENTALS** ☁

**TERRAIN**

**GEOMETRY** Opening: ~7'w x 7'h

- Section Length: ~100'



## Terrain Details

flat, faux concrete w/ seams

## Look and Feel Details

**Aesthetic:** featureless (NO texture), industrial hallway...think grungy airport moving walkway

**Obstacles:** long, featureless corridor

**Props:** minor, only in bumpouts in this section

**Lighting:** linear LED tube lights every 25'+

## Fabrication Details

- Decking: ~12"+h scaffold floor
- Walls: agam / theater flats, gray paneling
- Ceiling: gray/white, recessed ceiling tile type lights

TUNNEL

URBAN

CAVE

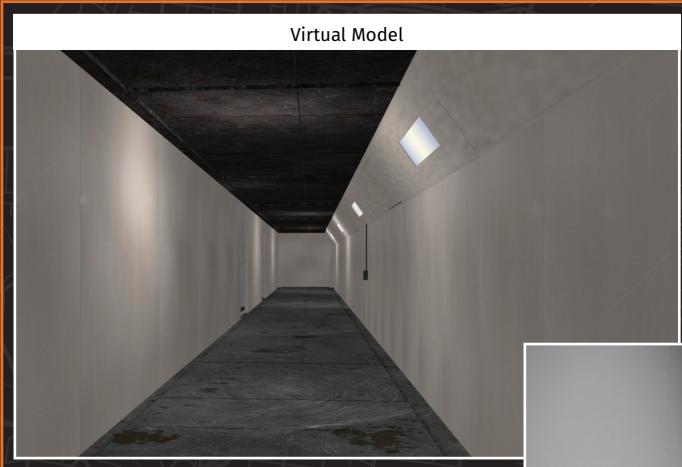
TUNNEL

URBAN

CAVE

# U02: A Grey Area

Virtual Model



Systems Build



# U03: Frightful Freight

This passage leads to the warehouse section but it also contains a dynamic obstacle made up of pipes and mesh that falls from the ceiling to block the robots from returning the same way.

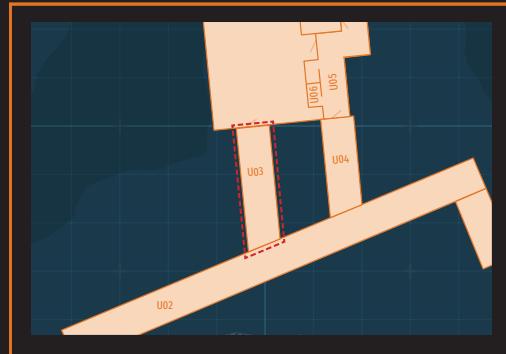
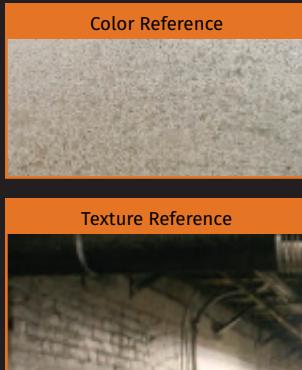
**DIFFICULTY RATING** 

**ENVIRONMENTALS** 

**TERRAIN**

**GEOMETRY** Opening: ~7'w x 7'h

- Section Length: ~30'



## Terrain Details

flat, faux concrete w/ seams

## Look and Feel Details

**Aesthetic:** weathered industrial hallway

**Obstacles:** freight dollies, safety bollards

**Props:** gray cart with stacked boxes

**Lighting:** wall-mounted, caged sconces every 20'

## Fabrication Details

- Decking: ~12"+h scaffold floor
- Walls: agam / theater flats, non-painted seamed drywall, plywood kick
- Ceiling: soft, aged gray, visible pipes

TUNNEL

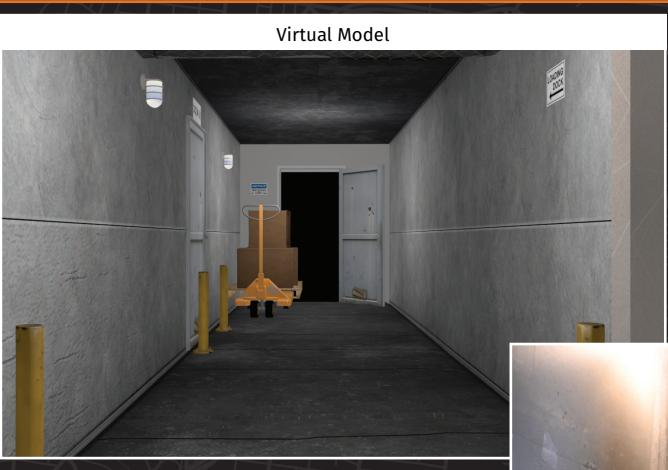
URBAN

CAVE

TUNNEL

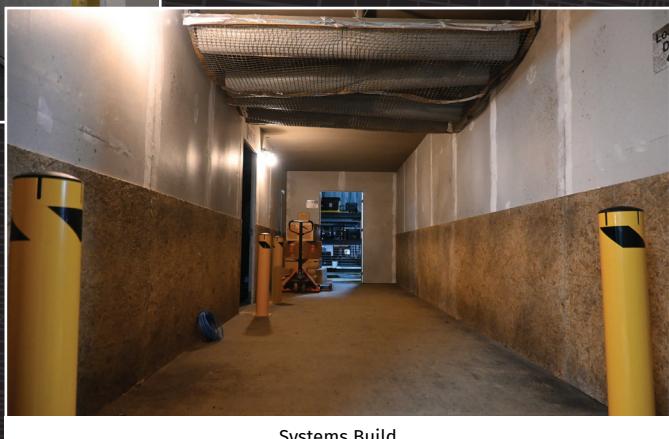
# U03: Frightful Freight

Virtual Model



URBAN

CAVE



Systems Build

# U04: 9-to-5

This passage leads to the mechanics offices and calls to mind the more unfinished areas found in the basement levels of many urban buildings.

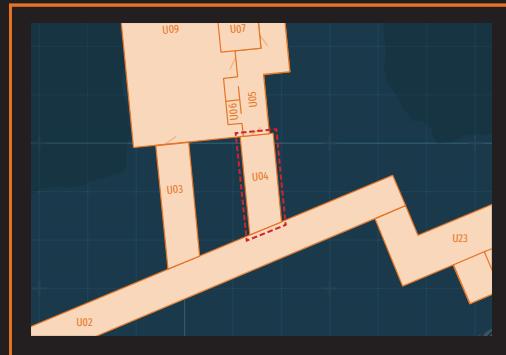
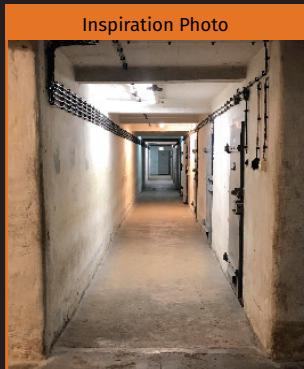
**DIFFICULTY RATING**    

## ENVIRONMENTALS

## TERRAIN

**GEOMETRY** Opening: ~5'w x 7'h

- Section Length: ~20'



## Terrain Details

flat, faux concrete w/ seams

## Look and Feel Details

**Aesthetic:** back-of-house staff hallway, stucco concrete finish

**Obstacles:** standard width door

**Props:** scenic treatments

**Lighting:** wall-mounted, sliver wall pack lights every 20'+

## Fabrication Details

- Decking: ~12" h scaffold floor
- Walls: theater flats, aging concrete, visible electrical pipes
- Ceiling: soft, aged gray, visible pipes/beams

TUNNEL



CAVE

TUNNEL

# U04: 9-to-5

URBAN

CAVE

Virtual Model



Systems Build



# U05-08: Mechanics' Offices

The narrow doorways and multiple side rooms require teams to fully explore the environment if they aim to find all the artifacts hidden here.

## DIFFICULTY RATING

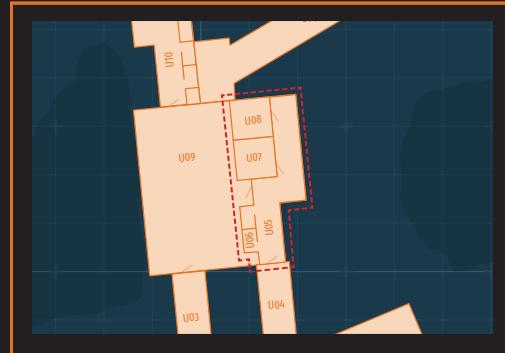


## ENVIRONMENTALS

## TERRAIN

## GEOMETRY

- Opening: ~5'w x 8'h hallways, 8' cube offices
- Section Length: ~40'



### Terrain Details

flat, faux concrete

### Look and Feel Details

**Aesthetic:** back-of-house office, storage & work shop

**Obstacles:** furniture, tools, supplies, lockers, etc

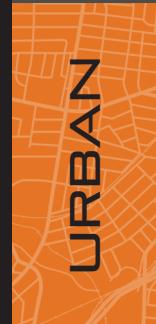
**Props:** small closets (cleaning supplies), larger offices (desk, filing cab) / 1 cluttered, 1 more open workable space/workshop

**Lighting:** wall-mounted, Sliver Pack Lights

### Fabrication Details

- Decking: ~12"+h scaffold floor
- Walls: agam modular wall panels, no doors, 2-tone weathered paint
- Ceiling: mixed hard and soft

TUNNEL



CAVE

TUNNEL

URBAN

CAVE

# U05-08: Mechanics' Offices

Virtual Model



Systems Build



# U09: The Warehouse

The large warehouse with shelving and a mezzanine level requires teams to fully explore this open space and is a likely candidate for marsupial deployments.

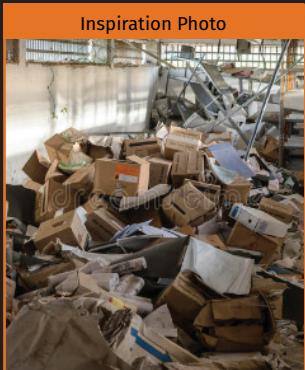
**DIFFICULTY RATING** 

**ENVIRONMENTALS** 

**TERRAIN** 

**GEOMETRY** Opening: ~40'L x 30'W x 32'H

- Section Length: ~40'



## Terrain Details

flat, faux concrete

## Look and Feel Details

**Aesthetic:** industrial weathered warehouse after an earthquake

**Obstacles:** shelving rows, multiple wall textures

**Props:** shelves, boxes, bins, pallets/crates on floor

**Lighting:** 1-2 Full Pack Lights per wall around perimeter

## Fabrication Details

- Decking: ~12" h scaffold floor, kick plate along pillar 183
- Walls: venue limestone, 3 brown tarps, + agam
- Ceiling: venue limestone throughout

TUNNEL

URBAN

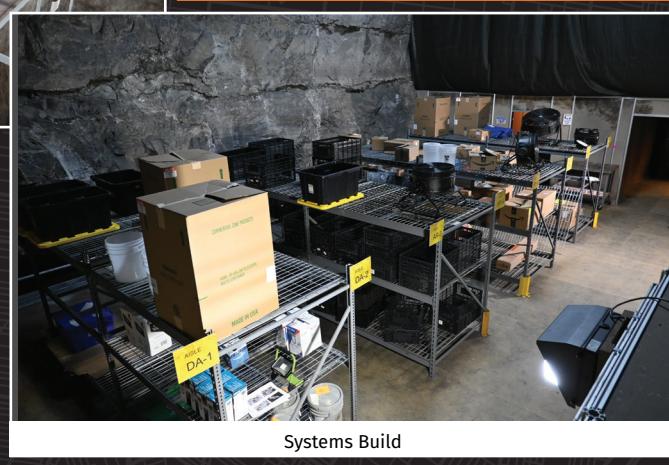
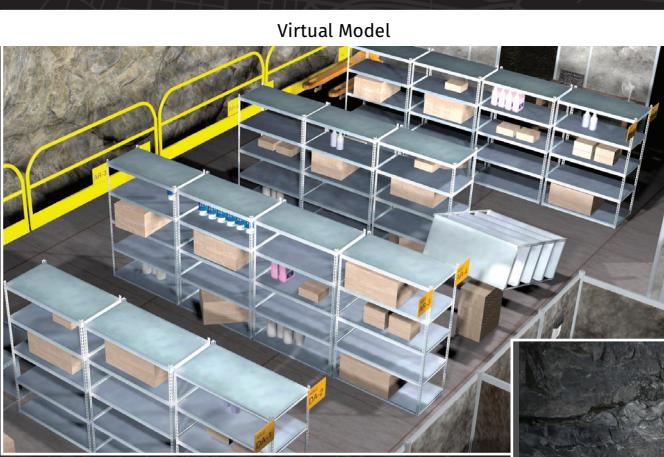
CAVE

TUNNEL

URBAN

CAVE

# U09: The Warehouse



# U10-13: Boiler Rooms

This section is not only an additional office-like area to explore, but it is also a dead end that does not connect to any other sections of the course.

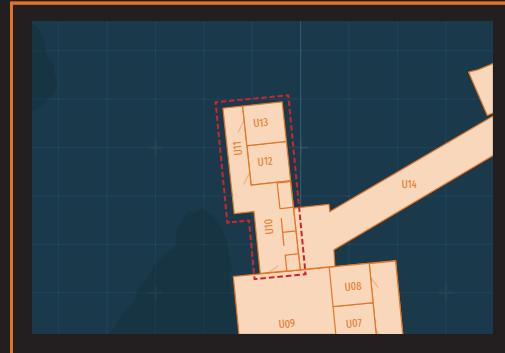
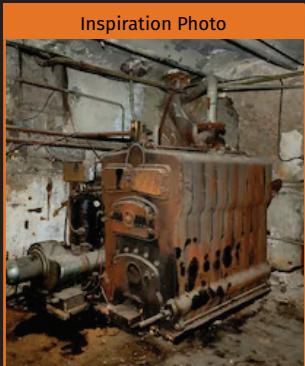
**DIFFICULTY RATING** 

**ENVIRONMENTALS** ⚡

**TERRAIN** 🏔

**GEOMETRY** Opening: ~5'w x 8'h hallways, 8' cube offices

- Section Length: ~40'



## Terrain Details

flat, faux concrete aged, + 2-4'h raised 'concrete' blocks

## Look and Feel Details

**Aesthetic:** boiler room, decrepit server rack closet

**Obstacles:** boiler, concrete slabs

**Props:** boiler, racks, shelves, desk, barrels

**Lighting:** wall-mounted, caged sconces every 20'

## Fabrication Details

- Decking: ~12"+h scaffold floor
- Walls: agam, no actual doors
- Ceiling: soft, weathered

TUNNEL

URBAN

CAVE

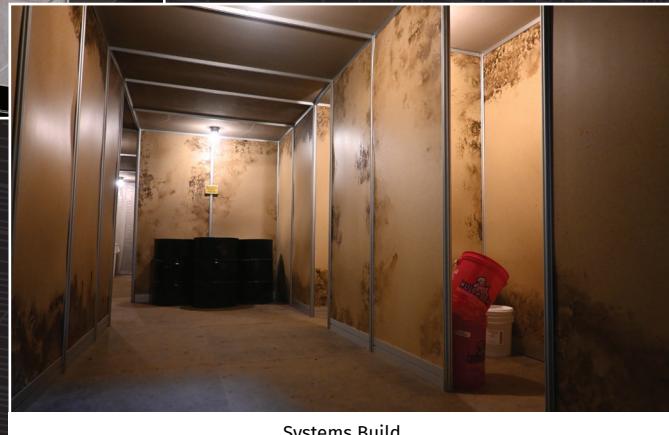
TUNNEL

URBAN

CAVE

# U10-13: Boiler Rooms

Virtual Model



Systems Build

# U14: Steam Tunnel

This constrained passage is a challenge for almost any robot, no matter the mode of mobility. To make things worse, this is also the location of a fog machine.

## DIFFICULTY RATING



## ENVIRONMENTALS

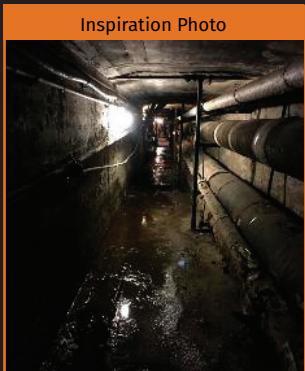
### TERRAIN



### GEOMETRY

Opening: ~100" w x 60" h

- Section Length: ~50'



### Terrain Details

flat, faux concrete aged, 'damp'

### Look and Feel Details

**Aesthetic:** damp steamtunnel

**Obstacles:** curved shape, pipes, chair, vertical post

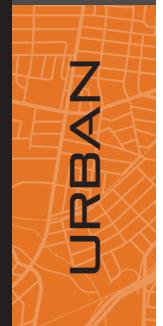
**Props:** curved shape, pipes, chair, vertical post

**Lighting:** LED 'Florescent' Style Tubes

### Fabrication Details

- Decking: ~14" h scaffold floor
- Walls: painted corrugated plastic
- Ceiling: painted corrugated plastic

TUNNEL



CAVE

TUNNEL

URBAN

CAVE

# U14: Steam Tunnel

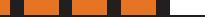
Virtual Model



Systems Build

# U15: That Tunnel Thrill

A long passage of metro-inspired rails. If the rails and wooden beams are not enough of a challenge, this area can get quite smoky when the fog is deployed.

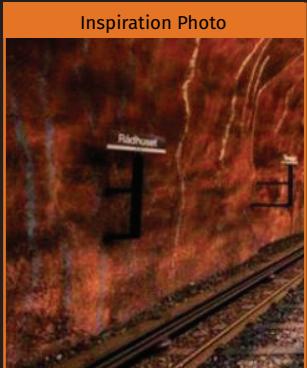
**DIFFICULTY RATING** 

**ENVIRONMENTALS** 

**TERRAIN** 

**GEOMETRY** Opening: ~12'w x 10'h+

- Section Length: ~150'



## Terrain Details

gray gravel

## Look and Feel Details

**Aesthetic:** subway tunnel, barren decrepit

**Obstacles:** 4' 8 1/2" spaced train tracks, gravel, signage, electrical boxes

**Props:** signage, RR track mechanics

**Lighting:** linear LED tube lights every 25'+

## Fabrication Details

- Decking: none
- Walls: theater flats + venue limestone
- Ceiling: soft, taught blackout fabric

TUNNEL



CAVE

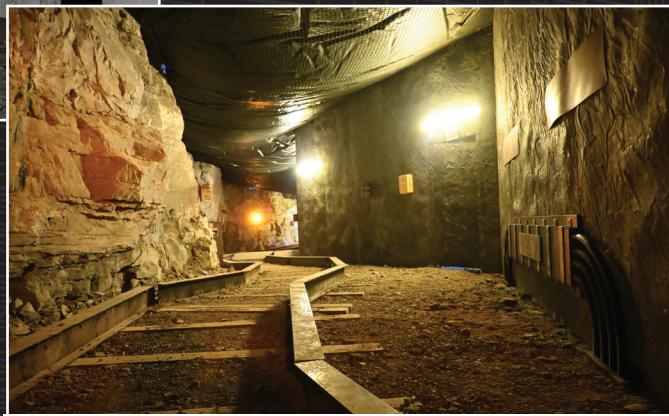
TUNNEL

URBAN

CAVE

# U15: That Tunnel Thrill

Virtual Model



Systems Build

# U16: Don't Jump!

This NYC-inspired metro platform presents a large cavern to explore. Getting down to the rail level requires taking the stairs - or potentially a tragic fall off of the platform.

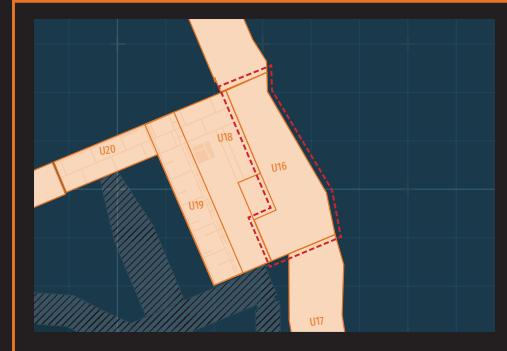
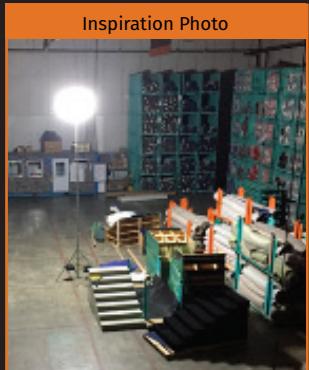
**DIFFICULTY RATING** 

**ENVIRONMENTALS** 

**TERRAIN** 

**GEOMETRY** Opening: ~12+'w x 36'h

- Section Length: ~40'



## Terrain Details

gray gravel

## Look and Feel Details

**Aesthetic:** subway station

**Obstacles:** train tracks, gravel, signage, electrical boxes

**Props:** signage, RR control lights

**Lighting:** Ceiling Hung-Airstar Light

## Fabrication Details

- Decking: none, steps up to platform
- Walls: venue limestone + cladded scaffold decking & theater flats
- Ceiling: venue limestone throughout

TUNNEL

URBAN

CAVE

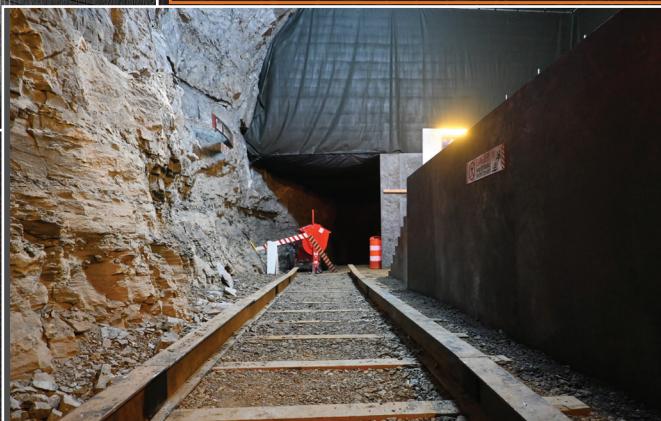
TUNNEL

URBAN

CAVE

# U16: Don't Jump!

Virtual Model



Systems Build

# U17: Corridor Construction

This section includes crossover points to the cave and tunnel subdomains and is the end of the line for the urban subdomain.

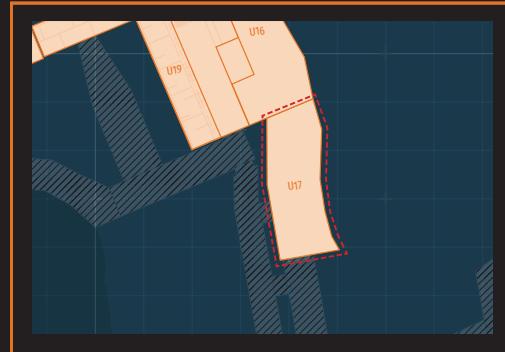
**DIFFICULTY RATING** 

**ENVIRONMENTALS** 

**TERRAIN** 

**GEOMETRY** Opening: ~12'w x 10'h+

- Section Length: ~40'



## Terrain Details

gray gravel + dirt

## Look and Feel Details

**Aesthetic:** subway tunnel construction, track laydown/extension, leads into cave

**Obstacles:** 4' 8 1/2" spaced train tracks + stopper, gravel, signage, electrical boxes

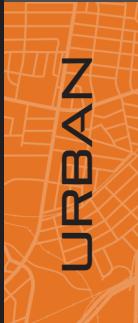
**Props:** signage, RR track mechanics, machinery, light tower

**Lighting:** Airstar Light on tripod

## Fabrication Details

- Decking: none
- Walls: venue limestone + theater flats
- Ceiling: soft, taught blackout fabric decking

TUNNEL



CAVE

TUNNEL

URBAN

CAVE

# U17: Corridor Construction

Virtual Model



Systems Build

# U18: The Yellow Line

Everything from the lighting to the signage in this platform is inspired by the NYC metro platforms. A grate in the platform gives a view into the underpass that is part of the tunnel subdomain.

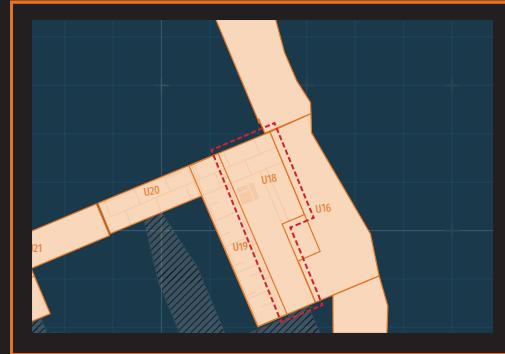
**DIFFICULTY RATING** 

**ENVIRONMENTALS** 

**TERRAIN** 

**GEOMETRY** Opening: ~42'L x 21'W x 6'8"+H min/28'H max

- Section Length: ~42'



## Terrain Details

faux large tiles

## Look and Feel Details

**Aesthetic:** NYC subway station

**Obstacles:** flooring grate, dropoff

**Props:** benches, trashcans, ads, signage

**Lighting:** LED 'Florescent' Style Tubes

## Fabrication Details

- Decking: ~5'h scaffold platform
- Walls: subway tile textured theater flats
- Ceiling: ~8'w section as scaffold ceiling, rest venue limestone

TUNNEL

URBAN

CAVE

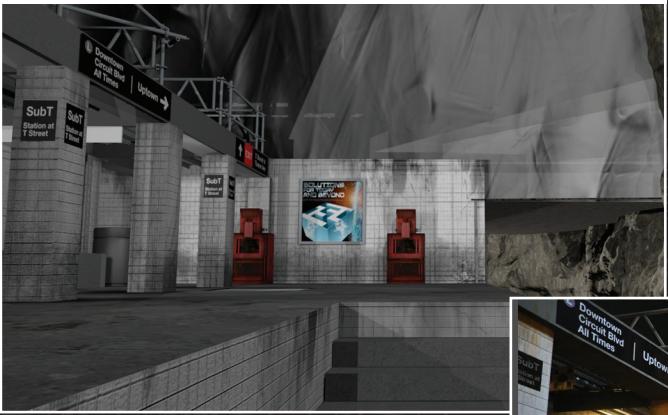
TUNNEL

URBAN

CAVE

# U18: The Yellow Line

Virtual Model



Systems Build

# U19: Roofline Ramble

The metro station also includes a mezzanine level to explore. This is a likely candidate for marsupial deployments of UAVs.

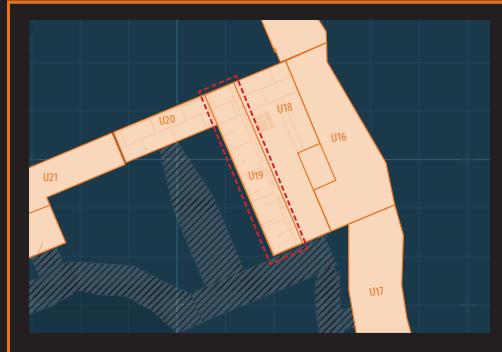
**DIFFICULTY RATING** 

**ENVIRONMENTALS** ☀️ 🌬️

**TERRAIN** 🚧

**GEOMETRY** Opening: ~42'L x 7'W

- Section Length: ~40'



## Terrain Details

metal slats

## Look and Feel Details

**Aesthetic:** raw infrastructure

**Obstacles:** overhead. Support bracing

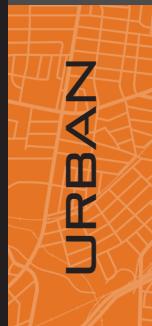
**Props:** none

**Lighting:** none

## Fabrication Details

- Decking: scaffold platform
- Walls: theater flats
- Ceiling: venue limestone

TUNNEL



CAVE

TUNNEL

URBAN

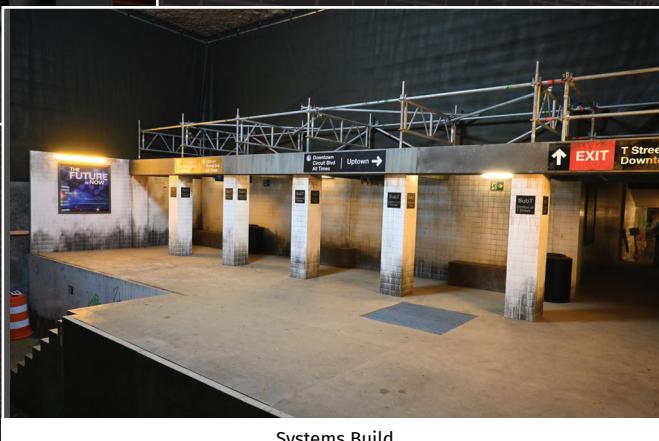
CAVE

# U19: Roofline Ramble

Virtual Model



Systems Build



# U20: Turnstile Trouble

Stairs are a simple yet difficult terrain obstacle for many ground robots. But teams that intend to explore the metro platform will have to navigate at least one set of stairs first.

## DIFFICULTY RATING



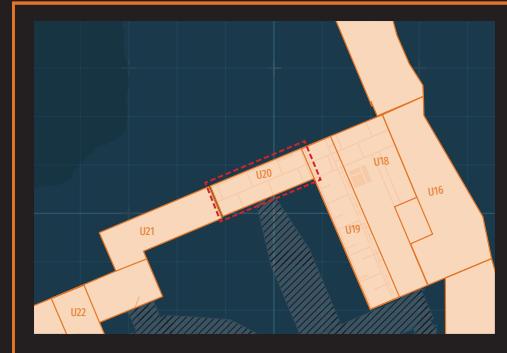
## ENVIRONMENTALS

### TERRAIN



**GEOMETRY** Opening: ~7'w x 7'h

- Section Length: ~30'



## Terrain Details

faux large tiles, concrete steps

## Look and Feel Details

**Aesthetic:** NYC subway station hallway post fire damage

**Obstacles:** stairs

**Props:** signage

**Lighting:** LED 'Florescent' Style Tubes

## Fabrication Details

- Decking: ~5'h scaffold platform, stairs
- Walls: subway tile textured theater flats
- Ceiling: soft, solid dark gray

TUNNEL

URBAN

CAVE

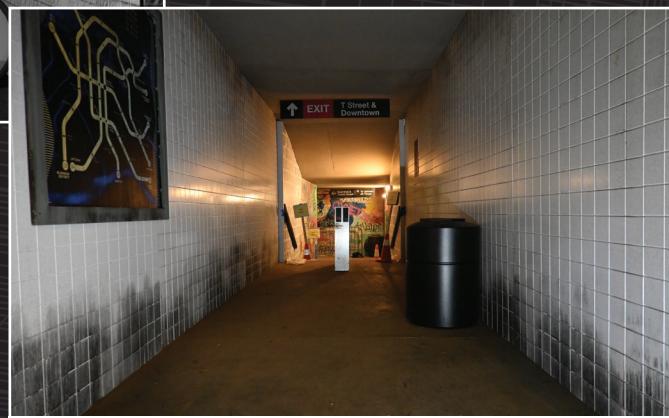
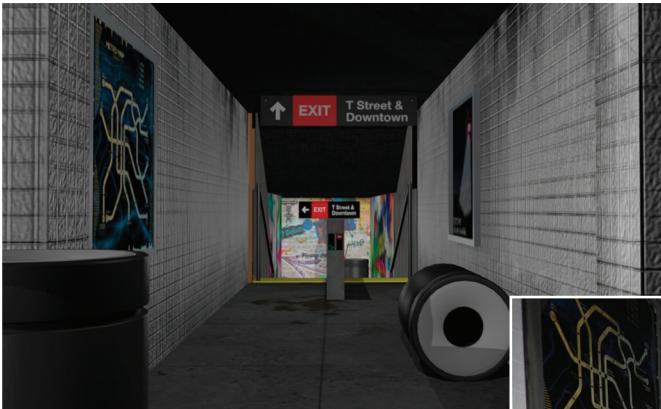
TUNNEL

URBAN

CAVE

# U20: Turnstile Trouble

Virtual Model



Systems Build

# U21: Subway Scribbles

The graffiti walls here are a throwback to the Urban Circuit graphic and a way to recognize the teams competing in the Final Event.

## DIFFICULTY RATING

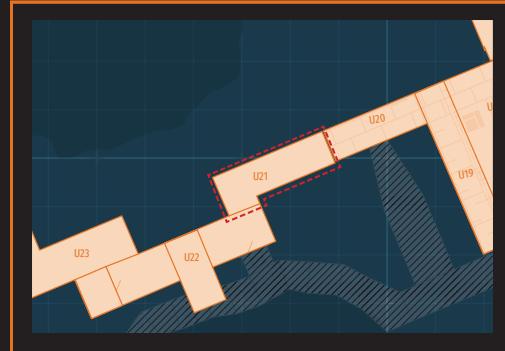


## ENVIRONMENTALS

## TERRAIN

**GEOMETRY** Opening: ~7'w x 7'h

- Section Length: ~40'



## Terrain Details

flat, faux concrete w/ seams

## Look and Feel Details

**Aesthetic:** underground pedestrian walkway

**Obstacles:** bike rack

**Props:** signage, lighting

**Lighting:** LED 'Florescent' Style Tubes

## Fabrication Details

- Decking: ~12"+h scaffold floor
- Walls: theater flats, graffiti walls
- Ceiling: soft, solid dark gray

TUNNEL



CAVE

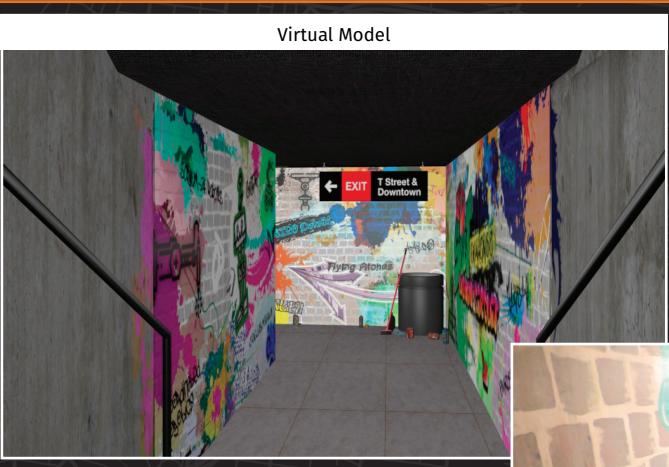
TUNNEL

URBAN

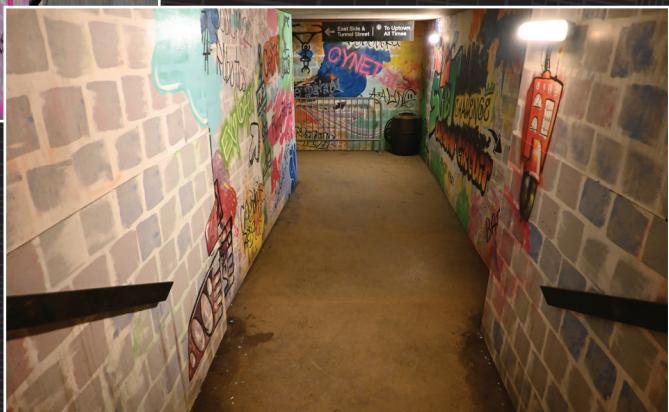
CAVE

# U21: Subway Scribbles

Virtual Model



Systems Build



# U22: Ladder's Climb

The ladder provides a visual cue that this construction-inspired section includes a mezzanine level. The mezzanine level extends over a section of the tunnel subdomain.

**DIFFICULTY RATING**

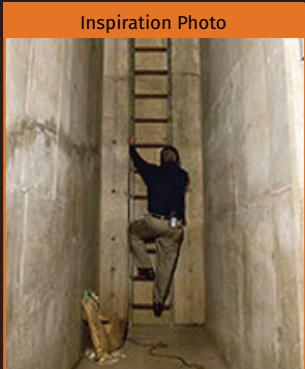


**ENVIRONMENTALS** ☀

**TERRAIN** 🏗️

**GEOMETRY** Opening: ~10'w x 7'h+

- Section Length: ~30'



## Terrain Details

flat, faux concrete w/ seams

## Look and Feel Details

**Aesthetic:** underground pedestrian walkway with service ladder

**Obstacles:** bike rack

**Props:** signage, lighting

**Lighting:** LED 'Florescent' Style Tubes

## Fabrication Details

- Decking: ~12"+h scaffold floor
- Walls: theater flats, graffiti walls, elevated bumpout over tunnel (Scaffold posts every 5-7')
- Ceiling: soft, solid dark gray

TUNNEL

URBAN

CAVE

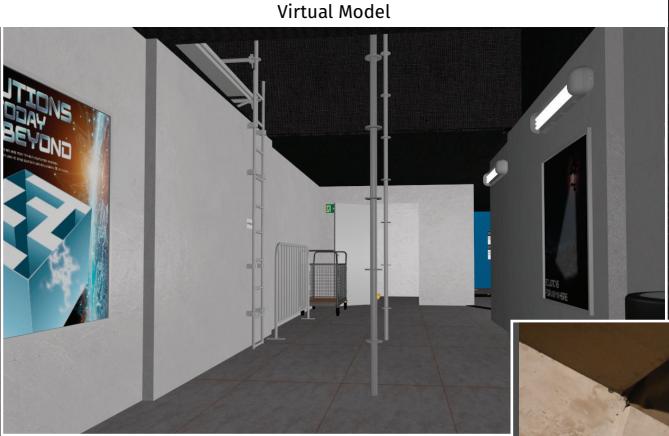
TUNNEL

URBAN

CAVE

# U22: Ladder's Climb

Virtual Model



Systems Build

# U23: Dandy Detour

The construction-inspired section is just past the featureless hallway and includes cable ramps as ground obstacle and further sets the tone for what lies ahead.

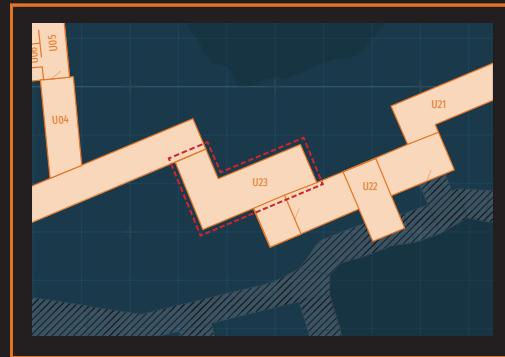
**DIFFICULTY RATING**    

**ENVIRONMENTALS** 

**TERRAIN**

**GEOMETRY** Opening: ~7'w x 7'h

- Section Length: ~25'



## Terrain Details

flat, faux concrete w/ seams

## Look and Feel Details

**Aesthetic:** walkway under construction

**Obstacles:** wall jutouts, ADA cable ramps on ground

**Props:** construction items

**Lighting:** linear 'fluorescent' lights every 20'+

## Fabrication Details

- Decking: ~12"+h scaffold floor
- Walls: theater flats, mismatch painted temp walls
- Ceiling: soft, solid dark gray

TUNNEL

URBAN

CAVE

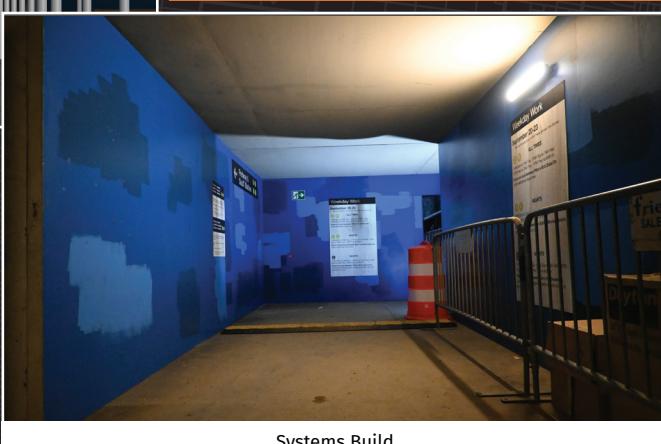
TUNNEL

URBAN

CAVE

# U23: Dandy Detour

Virtual Model



Systems Build



# CAVE

TUNNEL

URBAN

CAVE

CAVE

URBAN

TUNNEL

92



# Cave Entrance @ T02

DIFFICULTY RATING 

ENVIRONMENTALS

TERRAIN

**GEOMETRY** Opening: rounded 7'w x 7'h  
clearance inside 'arch'



## Look and Feel Details

**Aesthetic:** natural stones (browns, oranges, blacks)

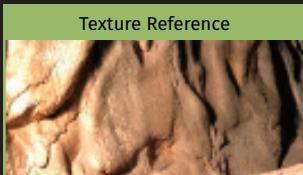
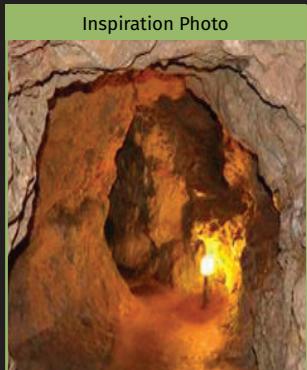
**Doorways:** rusty cave gate

**Structure:** organic shaped naturally occurring cave

**Lighting:** warm uplights every 20' (standard incandescent bulb recessed and hidden in rocks along right wall)

## Fabrication Details

- Decking: lumber ramp with spray foam terrain up to steel pod 10" height
- Walls: shaped and spray scenic foam
- Ceiling: shaped and spray scenic foam



TUNNEL

URBAN

CAVE

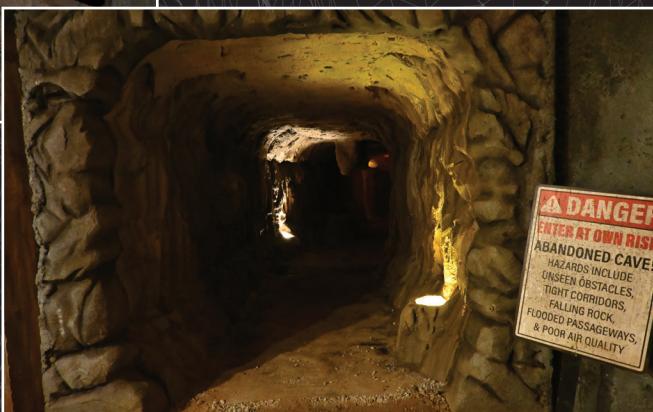
TUNNEL

URBAN

CAVE

# Cave Entrance @ T02

Virtual Model



Systems Build

# C01-05: All Natural

The entrance to the cave subdomain is relatively flat to intentionally mimic the easier walking paths found in commercial cave tours.

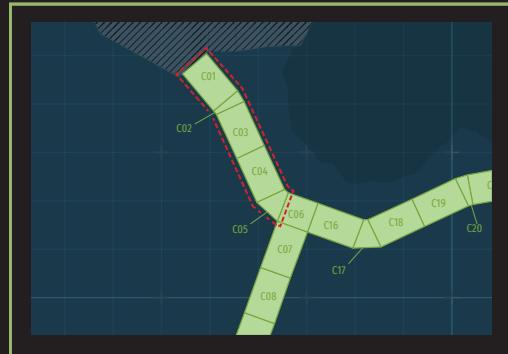
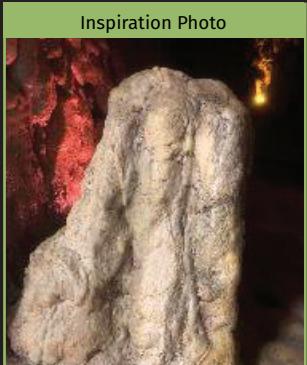
**DIFFICULTY RATING** 

**ENVIRONMENTALS**

**TERRAIN** 

**GEOMETRY** Opening: ~7'w x 7'h

- Section Length: ~40'



## Terrain Details

fairly-wide, couple protrusions

## Look and Feel Details

**Aesthetic:** warm toned, earthy rock formations

**Obstacles:** small ramps and rocky protrusions

**Props:** none

**Lighting:** fully enclosed warm uplight every 12'+

## Fabrication Details

- Decking: pod/container floor ~6+"h
- Walls: large natural rocks, minor protrusions
- Ceiling: large natural rocks, minimal protrusions

TUNNEL

URBAN

CAVE

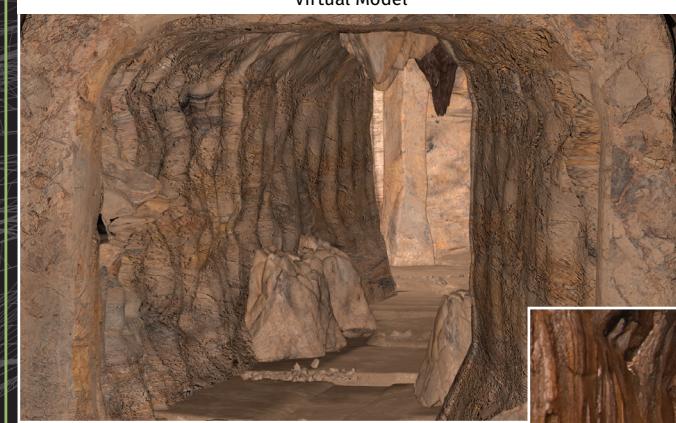
TUNNEL

URBAN

CAVE

# C01-05: All Natural

Virtual Model



Systems Build



# C06-11: Kids Corner

Taking a right at the first cave intersection leads to this inclined terrain passage that also includes a low ceiling. While the more difficult option, teams will be rewarded with reaching a small cavern.

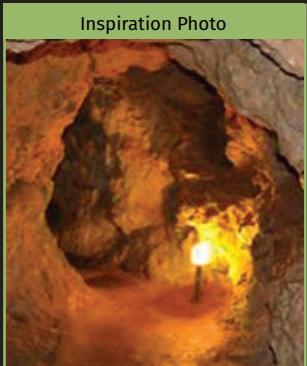
**DIFFICULTY RATING** 

**ENVIRONMENTALS**

**TERRAIN** 

**GEOMETRY** Opening: ~6'w x 7'h

- Section Length: ~60'



## Terrain Details

grainy, smoothed dirt texture, bumps in road

## Look and Feel Details

**Aesthetic:** yellow/orange natural earth

**Obstacles:** none

**Props:** none

**Lighting:** MR16 Gelled Birdies, every 12'+

## Fabrication Details

- Decking: pod/container floor ~6+''h
- Walls: natural stone
- Ceiling: natural stone

TUNNEL

URBAN

CAVE

TUNNEL

URBAN

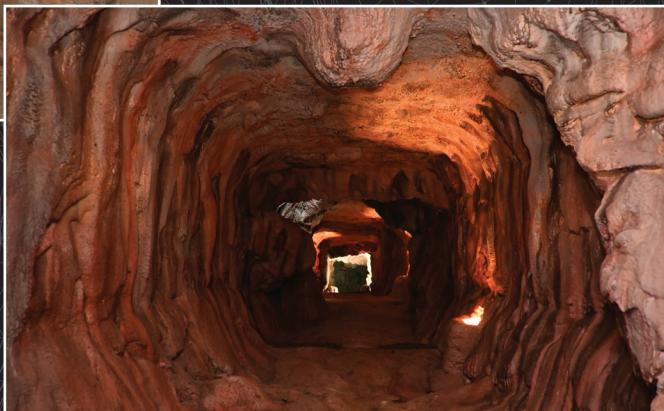
CAVE

# C06-11: Kids Corner

Virtual Model



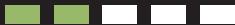
Systems Build



# C12-14: Discovery Zone

The decline in this passage leads out to the small cavern area.

## DIFFICULTY RATING



## ENVIRONMENTALS

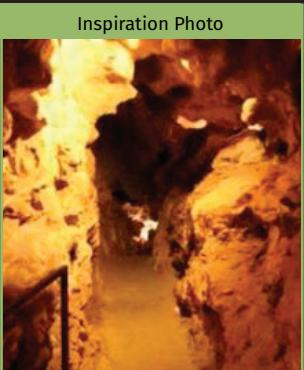
### TERRAIN



### GEOMETRY

Opening: ~5-6'w x 6-7'h

- Section Length: ~20'



### Terrain Details

grainy, smoothed dirt texture

### Look and Feel Details

**Aesthetic:** yellow/orange natural earth, tunnel opens to cavernous room

**Obstacles:** Rocky Protrusions

**Props:** None

**Lighting:** MR16 Gelled Birdies, every 12'+

### Fabrication Details

- Decking: pod/container floor ~6+"h
- Walls: natural stone
- Ceiling: natural stone

TUNNEL

URBAN

CAVE

TUNNEL

URBAN

CAVE

# C12-14: Discovery Zone

Virtual Model



Systems Build



# C15: The Playground

The small cavern area is close to the Staging Area to give teams an early chance to explore a cavernous room. It is also a dead end requiring teams to back track to get to the rest of the course.

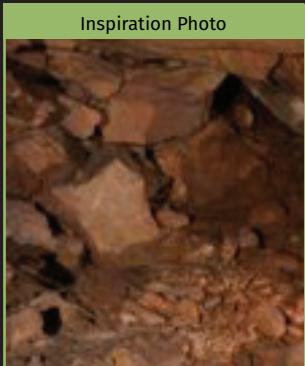
**DIFFICULTY RATING**

**ENVIRONMENTALS**

**TERRAIN**

**GEOMETRY** Opening: varying cavern

- Section Length: ~90'



## Terrain Details

natural venue ground, supplemental rocky aggregate

## Look and Feel Details

**Aesthetic:** Natural Limestone Walls and Rock Pile

**Obstacles:** loose rock pile

**Props:** none

**Lighting:** MR16 Gelled Birdies, every 12'+

## Fabrication Details

- Decking: none
- Walls: venue limestone + aggregate pile + drone block tarp
- Ceiling: venue limestone

TUNNEL

URBAN

CAVE

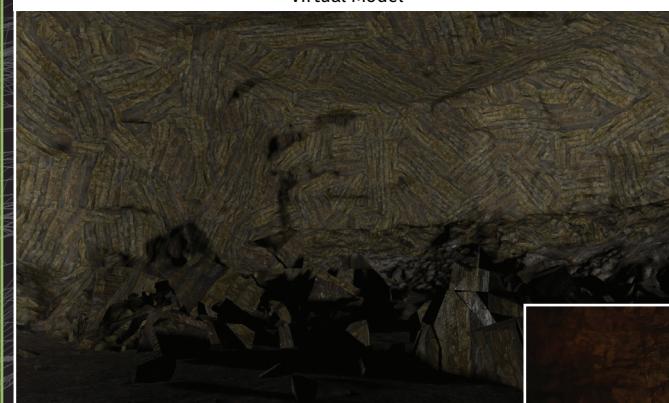
TUNNEL

URBAN

CAVE

# C15: The Playground

Virtual Model



Systems Build



# C16-20: Back to Business

Sculpted angular walls and increasingly varying terrain as the course winds its way around the first corner. Lighting continues to resemble commercial cave uplighting.

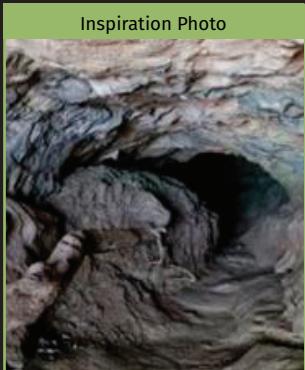
**DIFFICULTY RATING** 

**ENVIRONMENTALS** ☀

**TERRAIN** 

**GEOMETRY** Opening: ~6-7'w x 6-7'h

- Section Length: ~35'



## Terrain Details

grainy, dirt texture, bumps in road

## Look and Feel Details

**Aesthetic:** Dessert Cave into Cream Cave. Carving would be much larger scale than sample. Cream with rust into more intense warm colors. mini wave texture gives way to smooth swoops. Large curves, open, satin sheen, tans and creams.

**Props:** none

**Lighting:** MR16 Gelled Birdies, every 12'+

## Fabrication Details

- Decking: pod/container floor ~6+"h
- Walls: natural stone, not too many constraints
- Ceiling: natural stone

TUNNEL

URBAN

CAVE

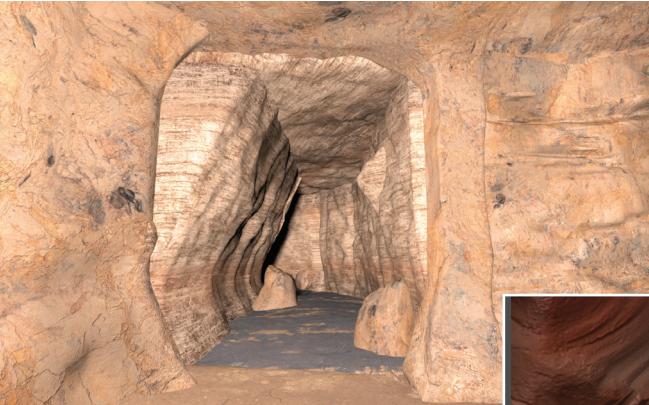
TUNNEL

URBAN

CAVE

# C16-20: Back to Business

Virtual Model



Systems Build



# C21-23: The Gateway

Smooth bulging walls lead to the crossover point to the tunnel subdomain.

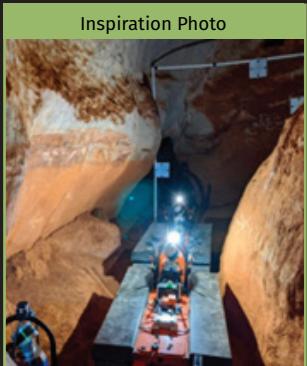
**DIFFICULTY RATING** 

**ENVIRONMENTALS** ☀

**TERRAIN** ☁

**GEOMETRY** Opening: ~6-7'w x 6-7'h

- Section Length: ~35'



## Terrain Details

grainy, dirt texture, bumps in road

## Look and Feel Details

**Aesthetic:** browns and oranges, Great Canyon esque

**Obstacles:** None

**Props:** cave gate door into tunnel

**Lighting:** MR16 Gelled Birdies, every 12'+

## Fabrication Details

- Decking: pod/container floor ~6+"h
- Walls: natural stone, not too many constraints, especially at turns
- Ceiling: natural stone

TUNNEL

URBAN

CAVE

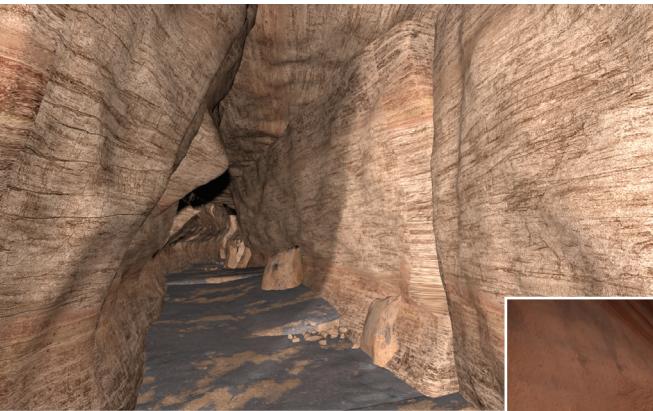
TUNNEL

URBAN

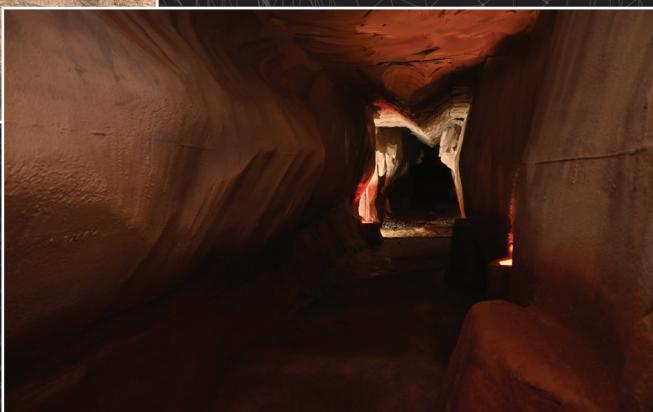
CAVE

# C21-23: The Gateway

Virtual Model



Systems Build



# C24-25: Player's Choice

This decision point presents the choice between a longer passage to the right or a steep incline that crosses up and over a tunnel segment below.

## DIFFICULTY RATING



## ENVIRONMENTALS

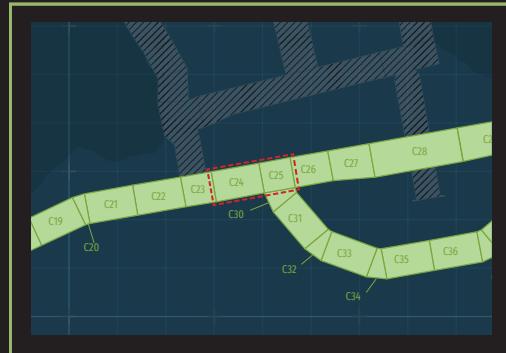
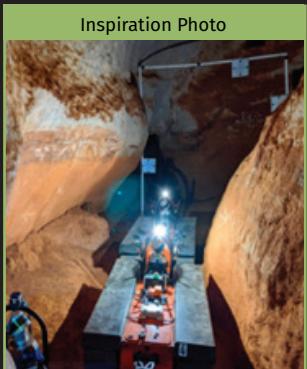
### TERRAIN



## GEOMETRY

Opening: ~6'w x 7'h into constrained bridge

- Section Length: ~30'



## Terrain Details

wavy ripples, layered uneven terrains on left, fairly flat with loose aggregate on right

## Look and Feel Details

**Aesthetic:** orangish chunks to swirlies blues

**Obstacles:** occasional protrusion

**Props:** none

**Lighting:** MR16 Gelled Birdies, every 12'+

## Fabrication Details

- Decking: pod/container floor ~6+"h
- Walls: natural stone, not too many constraints, especially at turns
- Ceiling: uneven

TUNNEL

URBAN

CAVE

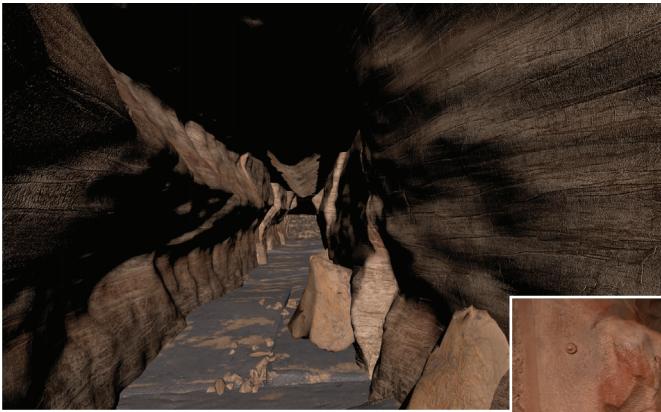
TUNNEL

URBAN

CAVE

# C24-25: Player's Choice

Virtual Model



Systems Build



# C26-29: Beastly Bridge

Very steep incline and low ceilings present challenges for all mobility types. This resembles many steeper sections of caves and is one of the “human crawlable” sections.

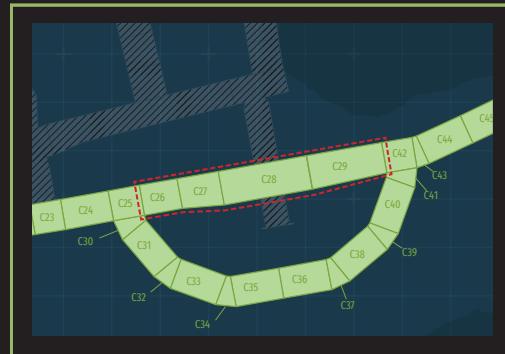
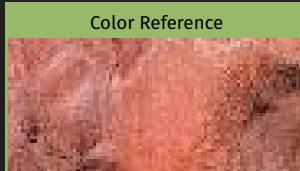
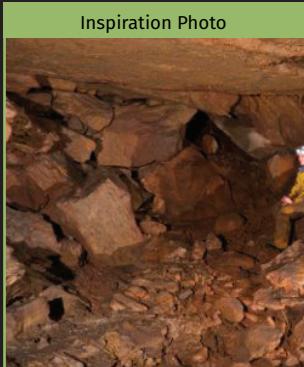
**DIFFICULTY RATING**

**ENVIRONMENTALS** ☀

**TERRAIN**

**GEOMETRY** Opening: 6'w x 4-5.5'h

- Section Length: ~50'



## Terrain Details

very rocky incline, but not loose stone / constrained bridge pathway and down ramp rocky but not as large (natural formations and terrain change that create natural stacked rock footings for legged robots to climb up/down)

## Look and Feel Details

**Aesthetic:** Red Cave coloring with increasing amounts of spray foam and gloss as we go over the bridge and down the other side

**Obstacles:** rocks and protrusions

**Props:** none

**Lighting:** MR16 Gelled Birdies, every 12'+

## Fabrication Details

- Decking: pod/container floor ~6+"h
- Walls: rocky
- Ceiling: flat, hard, rock overhead

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# C26-29: Beastly Bridge

Virtual Model



Systems Build



# C30-35: Easy Street

Robots that avoided the steep incline of Beastly Bridge are instead met with increasingly difficult ground terrain, sand, and swooping sculpted walls inspired by caves formed by seepage along a geological seam.

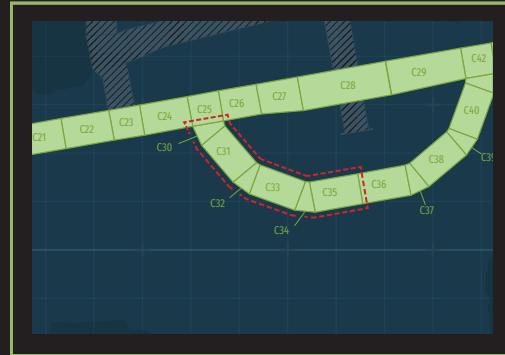
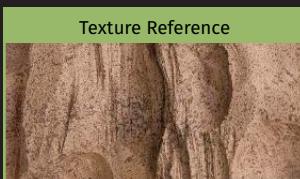
**DIFFICULTY RATING** 

**ENVIRONMENTALS** 

**TERRAIN** 

**GEOMETRY** Opening: ~6-7'w x 6-7'h

- Section Length: ~40'



## Terrain Details

glossy bumpy rock texture

## Look and Feel Details

**Aesthetic:** seapumice cave into wet sea cave colors, matte sheen, pockmarked, small ceiling lumps in C35, holes in walls and ceiling

**Obstacles:** none

**Props:** none

**Lighting:** MR16 Gelled Birdies, every 12'+

## Fabrication Details

- Decking: pod/container floor ~6+"h
- Walls: holes in rocks
- Ceiling: chunky

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# C30-35: Easy Street

Virtual Model

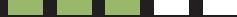


Systems Build



# C36-39: The Wraparound

This section begins the introduction of more stalactites and stalagmites in the course as significant terrain obstacles.

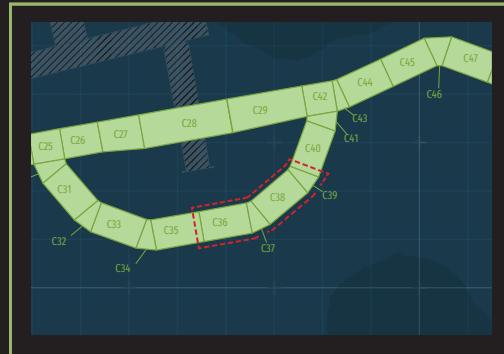
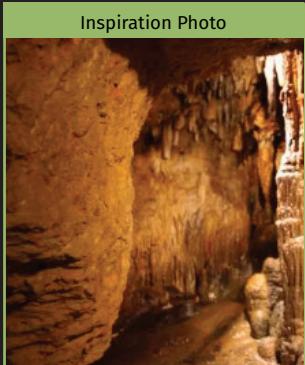
**DIFFICULTY RATING** 

**ENVIRONMENTALS** 

**TERRAIN** 

**GEOMETRY** Opening: ~6'w x 6'h

- Section Length: ~30'



## Terrain Details

glossy bumpy rock texture

## Look and Feel Details

**Aesthetic:** jagged, patchy gloss into total gloss, browns, pockmarked with drips

**Obstacles:** ramps & rocks

**Props:** none

**Lighting:** MR16 Gelled Birdies, every 12'+

## Fabrication Details

- Decking: pod/container floor ~6+"h
- Walls: 'bubbly' rocks
- Ceiling: some drips some flat

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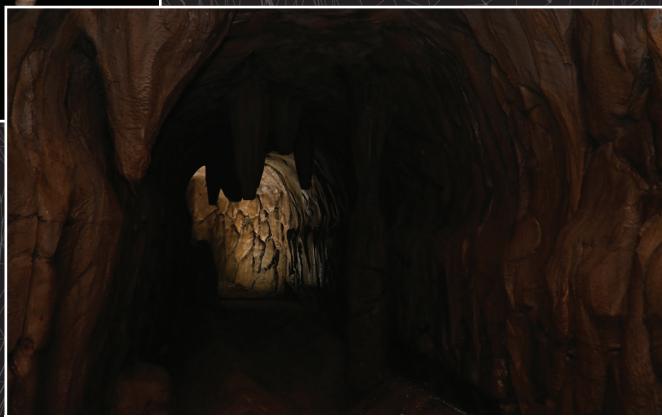
CAVE

# C36-39: The Wraparound

Virtual Model

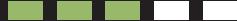


Systems Build



# C40-44: Closed Circuit

The back side of the intersection gives robots a more gradual incline (though still steep) to the Beastly Bridge section. The ground terrain includes a lot of natural rocky and muddy aggregate.

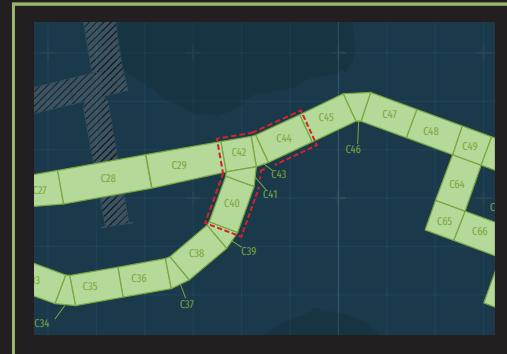
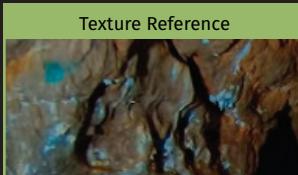
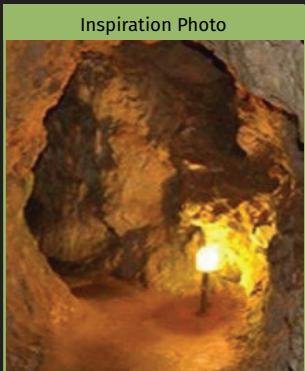
**DIFFICULTY RATING** 

**ENVIRONMENTALS**

**TERRAIN** 

**GEOMETRY** Opening: ~7'w x 6'h

- Section Length: ~35'



## Terrain Details

bumpy, ramped, rocky, couple stalagmites

## Look and Feel Details

**Aesthetic:** warm toned, earthy rock formations

**Obstacles:** large ramps and rocky protrusions

**Props:** none

**Lighting:** MR16 Gelled Birdies, every 12'+

## Fabrication Details

- Decking: pod/container floor ~6+"h
- Walls: large natural rocks, some protrusions
- Ceiling: large natural rocks, some stalactites

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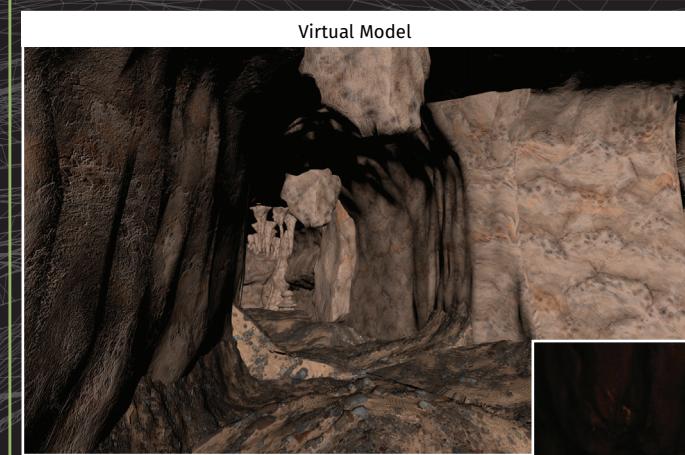
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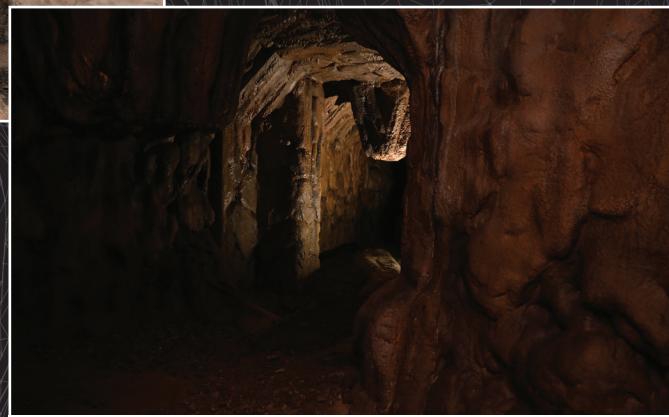
CAVE

# C40-44: Closed Circuit

Virtual Model



Systems Build



# C45-48: Whiplash

Rocky sculpted walls, cave formations, and increasingly difficult terrain. Some parts of this section require human personnel to duck and sidestep to get through.

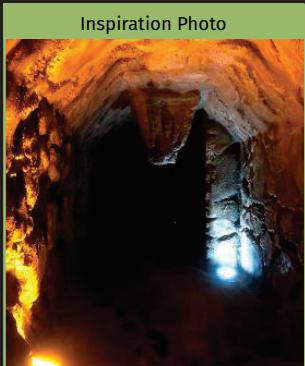
**DIFFICULTY RATING** █ █ █ █ █

**ENVIRONMENTALS** ⚛

**TERRAIN** 🏜️

**GEOMETRY** Opening: ~7'w x 6'h

- Section Length: ~35'



## Terrain Details

glossy bumpy rock texture, loose rocks

## Look and Feel Details

**Aesthetic:** sandy & brown, large lumps, patchy gloss, accretions

**Obstacles:** rocks

**Props:** none

**Lighting:** MR16 Gelled Birdies, every 12'+

## Fabrication Details

- Decking: pod/container floor ~6+"h
- Walls: crevices in walls
- Ceiling: larger rock chunks

TUNNEL

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CAVE

TUNNEL

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CAVE

# C45-48: Whiplash

Virtual Model



Systems Build

# C49-52: The Junction

The intersection to the back half of the cave subdomain. Straight ahead is sand that foreshadows the upcoming stream passage. To the right is a foreboding passage to a dynamic obstacle.

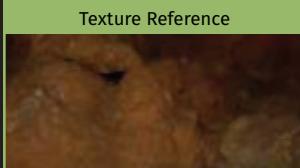
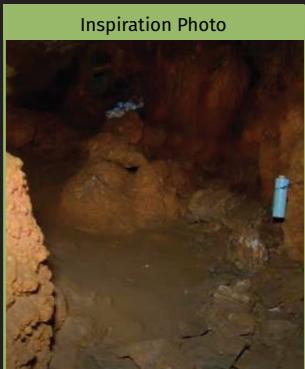
**DIFFICULTY RATING** 

**ENVIRONMENTALS**

**TERRAIN** 

**GEOMETRY** Opening: ~6-8'w x 7'h

- Section Length: ~20'



## Terrain Details

layers, remnants of stream pathway

## Look and Feel Details

**Aesthetic:** dried river bend, pebbly, rusty browns

**Obstacles:** tight corners

**Props:** signage

**Lighting:** MR16 Gelled Birdies, every 12'+

## Fabrication Details

- Decking: pod/container floor ~6+"h
- Walls: lots of rock protrusions
- Ceiling: rocky

TUNNEL

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CAVE

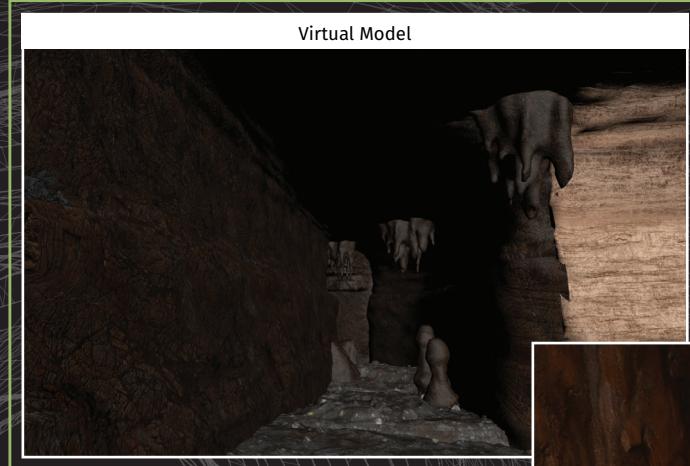
TUNNEL

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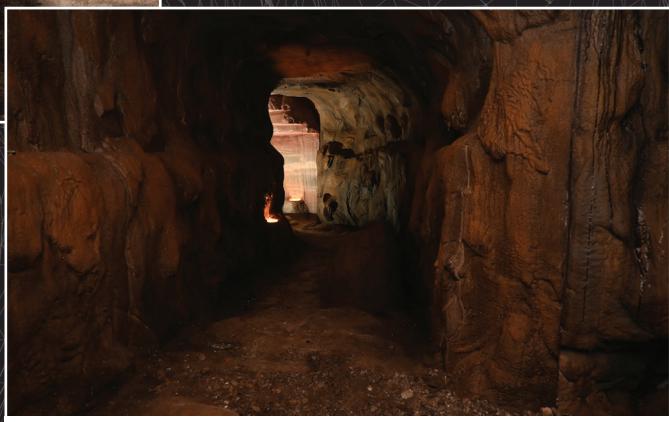
CAVE

# C49-52: The Junction

Virtual Model



Systems Build



# C53-59: Washup

This section begins with small puddles and then large puddles of standing water to resemble stream passages found in many caves.

**DIFFICULTY RATING**

**ENVIRONMENTALS** ⚡

**TERRAIN**

**GEOMETRY** Opening: ~8'w x 6'h

- Section Length: ~65'



## Terrain Details

glossy, rounded rock valley with 2-4" deep water puddle path

## Look and Feel Details

**Aesthetic:** water stream corridor...erosion lines/stair steps, cream with just rails and filth

**Obstacles:** sporadic water puddles (contained within pod)

**Props:** water

**Lighting:** MR16 Gelled Birdies, every 12'+

## Fabrication Details

- Decking: pod/container floor ~6+"h
- Walls: smoothed out from rushing water over the years
- Ceiling: bumpy

TUNNEL

URBAN

CAVE

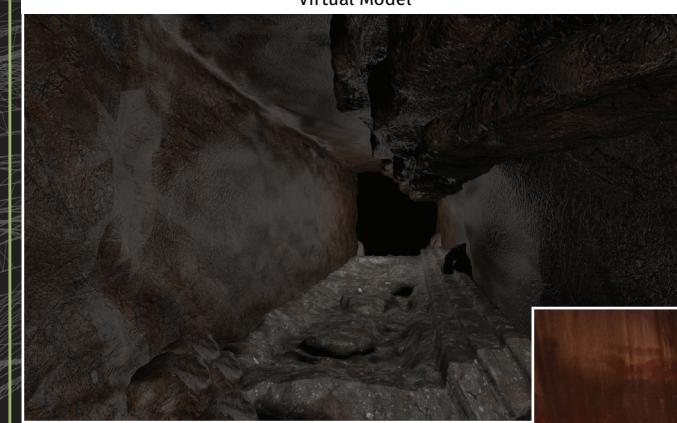
TUNNEL

URBAN

CAVE

# C53-59: Washup

Virtual Model



Systems Build



# C60-63: Leave Only Footprints

The crossover point to both the tunnel and urban subdomains, this passage has dripping sculpted walls, rocky bumpy ground terrain, and low lighting.

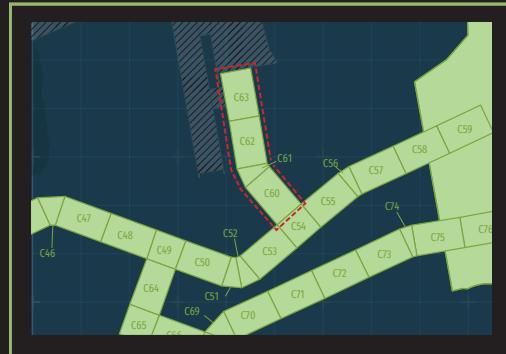
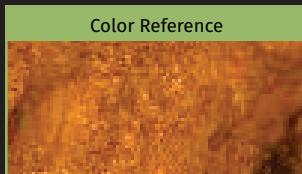
**DIFFICULTY RATING** 

**ENVIRONMENTALS** ⚡

**TERRAIN** 🌱⚡

**GEOMETRY** Opening: ~5'w x 8'h

- Section Length: ~35'



## Terrain Details

flatter rock texture, transition to man-made ground

## Look and Feel Details

**Aesthetic:** a wavy corridor, eroding and undulating walls, reds, browns

**Obstacles:** none

**Props:** none

**Lighting:** MR16 Gelled Birdies, every 12'+

## Fabrication Details

- Decking: pod/container floor ~6+"h
- Walls: connections into urban & tunnel
- Ceiling: starts to flatten out

TUNNEL

URBAN

CAVE

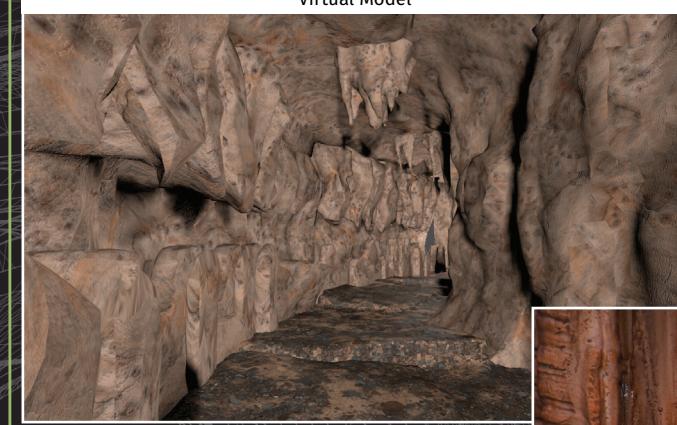
TUNNEL

URBAN

CAVE

# C60-63: Leave Only Footprints

Virtual Model



Systems Build



# C64-67: That's a Wraparound

The seemingly easier (drier) passage, but robots that chose the side passage will encounter a dynamic obstacle in the form of a rockfall that closes off their return path home.

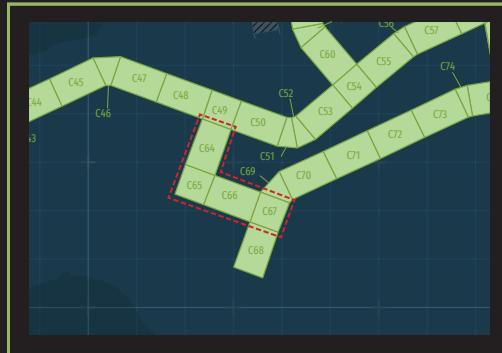
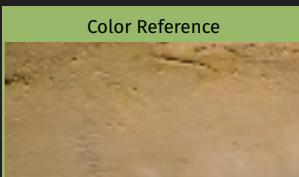
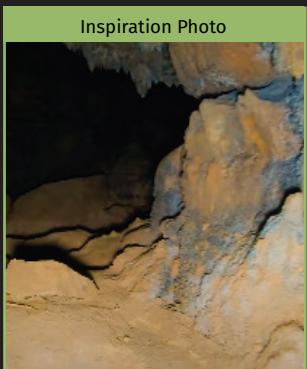
**DIFFICULTY RATING** ■ ■ ■ ■ ■

**ENVIRONMENTALS** ☀️

**TERRAIN** 🏜️

**GEOMETRY** Opening: 6'w x 6'h

- Section Length: ~40'



## Terrain Details

dry rocks, dirt

## Look and Feel Details

**Aesthetic:** glossy rock formations, some blues, sparkle, light browns

**Obstacles:** rocks

**Props:** none

**Lighting:** MR16 Gelled Birdies, every 12'+

## Fabrication Details

- Decking: pod/container floor ~6+"h
- Walls: mixture of finishes
- Ceiling: not level, smaller drippings

TUNNEL

URBAN

CAVE

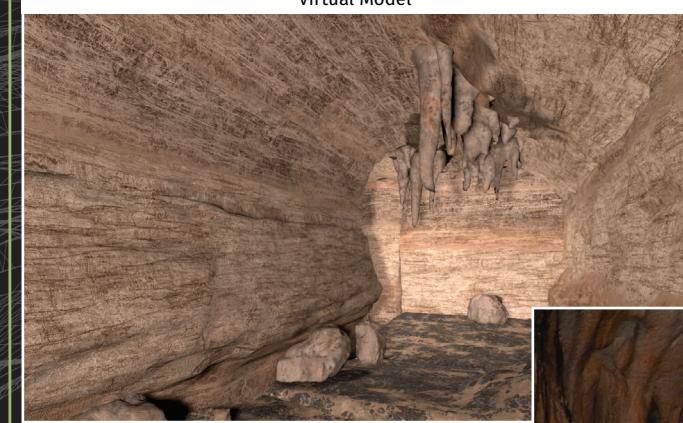
TUNNEL

URBAN

CAVE

# C64-67: That's a Wraparound

Virtual Model



Systems Build



# C68: Step It Up

A steep stepped incline made up of carved rock leads to a ledge and a dead end.

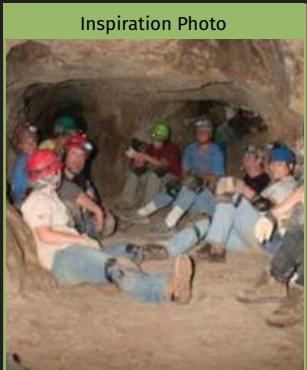
## DIFFICULTY RATING

## ENVIRONMENTALS

## TERRAIN

## **GEOMETRY** Opening: ~7'w x 7'h diminishing

- Section Length: ~11'



## Inspiration Photo



## Texture Reference



## Terrain Details

semi glossy rocks

## Look and Feel Details

**Aesthetic:** dead end earth pocket

## **Obstacles:** steps

## Props: gear

**Lighting:** MR16 Gelled Birdies, every 12'+

## Fabrication Details

- Decking: pod/container floor ~6+”h
  - Walls: rounded edges
  - Ceiling: relatively smooth and flat

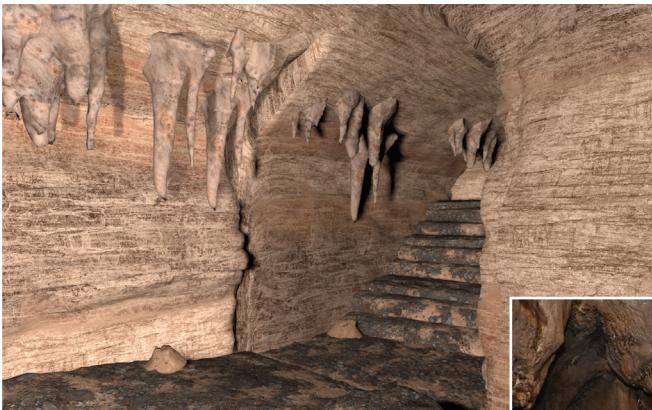
TUNNEL

URBAN

CAVE

# C68: Step It Up

Virtual Model



Systems Build

# C69-72: Are We There Yet?

The first half of the formation-heavy section. Stalactites and stalagmites present significant obstacles.

## DIFFICULTY RATING



## ENVIRONMENTALS

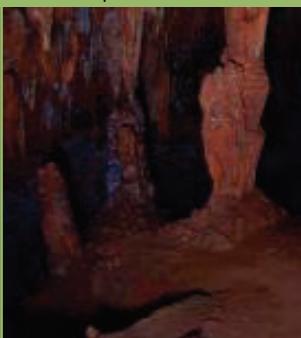


# TERRAIN

## **GEOMETRY** Opening: ~8'w x 8'h

- Section Length: ~35'

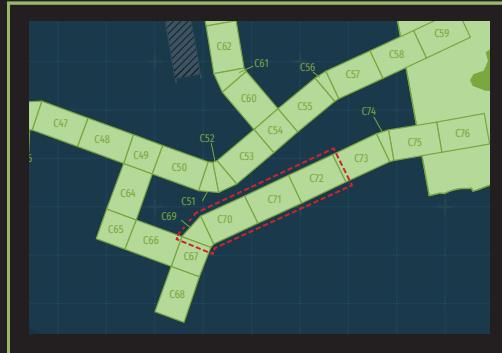
## Inspiration Photo



## Color Reference



## Texture Reference



## Terrain Details

## stalagmite, tite, and nate formations

## Look and Feel Details

**Aesthetic:** spiky look, teeth/drips, heavy gloss sheen

### Obstacles: jagged edges

**Props:** none

**Lighting:** MR16 Gelled Birdies, every 12'+

## Fabrication Details

- Decking: pod/container floor ~6+"h
  - Walls: 'sharper edges', not as smooth
  - Ceiling: relatively flat with dripped rock formations

TUNNEL

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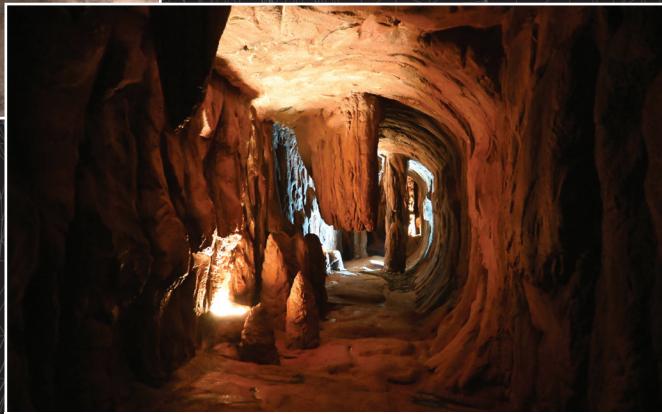
CAVE

# C69-72: Are We There Yet?

Virtual Model



Systems Build



# C73-76: A Stalagnate Story

The second half of the formation-heavy section. In addition to stalactites and stalagmites, the ground terrain presents increasingly difficult mobility challenges before exiting into a large cavern.

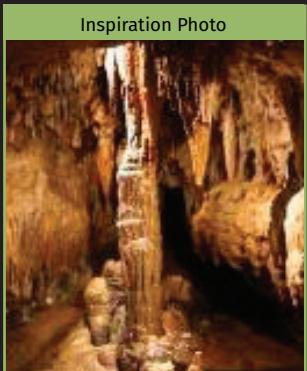
**DIFFICULTY RATING**

**ENVIRONMENTALS**

**TERRAIN**

**GEOMETRY** Opening: ~7'w x 7'h

- Section Length: ~35'



## Terrain Details

sandy rock piles

## Look and Feel Details

**Aesthetic:** a very drippy cave

**Obstacles:** stalagmites & stalactites

**Props:** none

**Lighting:** MR16 Gelled Birdies, every 12'+

## Fabrication Details

- Decking: pod/container floor ~6+"h
- Walls: candlewax look
- Ceiling: candlewax look

TUNNEL

URBAN

CAVE

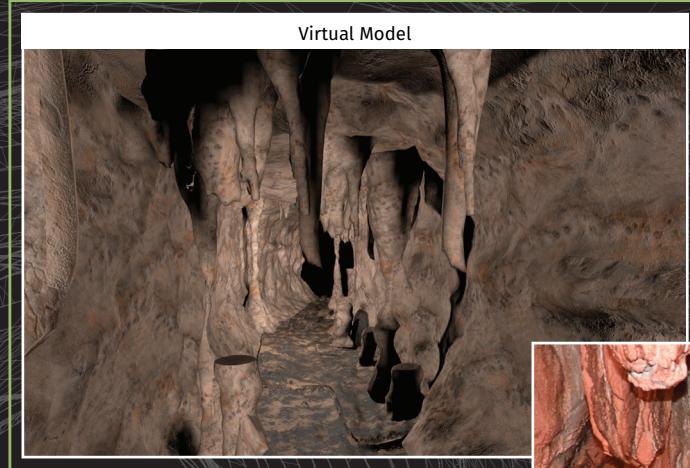
TUNNEL

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CAVE

# C73-76: A Stalagnate Story

Virtual Model



Systems Build



# C77-78: Cave of Wonders

A massive cavern with muddy terrain, rock piles, large ramp, and ledge to explore. Two cave pods in the middle of the cavern present a mezzanine level and more constrained passage within the cavern.

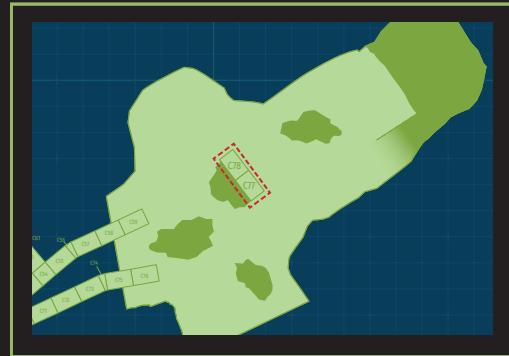
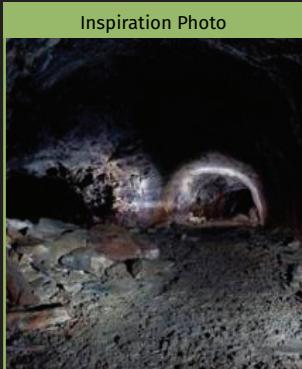
**DIFFICULTY RATING** █ █ █ █ █

**ENVIRONMENTALS** ☀️ 🌬️ 💧 🐛

**TERRAIN** 🌬️ 🏔️ 🏙️

**GEOMETRY** Opening: ~7'w x 7'h island structure hallway

- Section Length: ~22'



## Terrain Details

sandy, rock piles

## Look and Feel Details

**Aesthetic:** large open cavern, cave pods heavy spray, matte with gloss areas, gray rocks

**Obstacles:** terrain, pods, rock ramp up to ledge

**Props:** none

**Lighting:** MR16 Gelled Birdies, every 12'+

## Fabrication Details

- Decking: natural venue ground
- Walls: foam sprayed interior pods, unfinished exterior
- Ceiling: venue

TUNNEL

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CAVE

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CAVE

# C77-78: Cave of Wonders

Virtual Model



Systems Build





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