

Materials, Design and Cost Study Polly Ann Equestrian Trail Improvements



Oakland County, Michigan

Department of Natural Resources
Forest, Mineral and Fire Management Division



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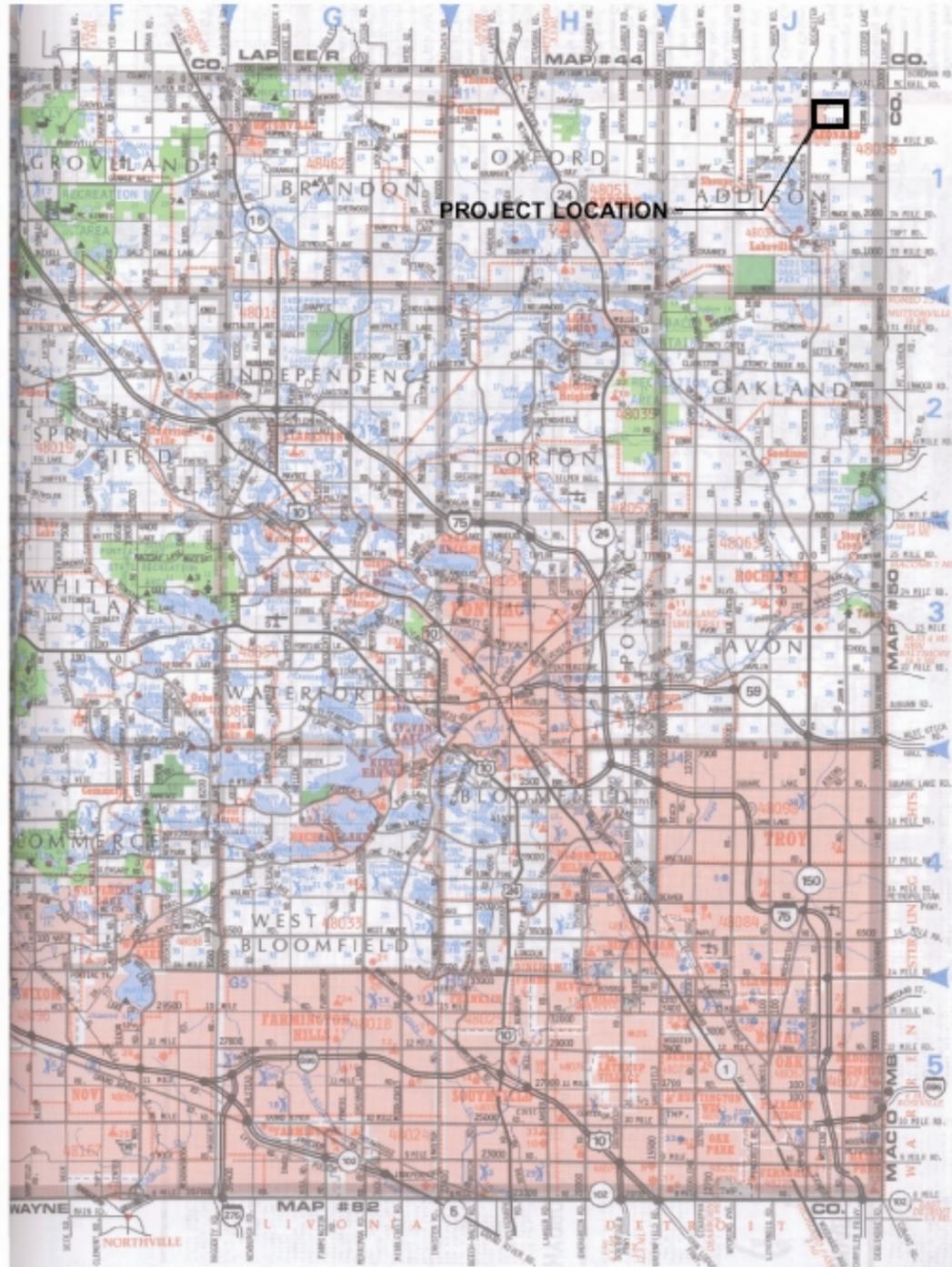
Polly Ann Equestrian Trail

Oakland County, Michigan



Location Map

This section of Polly Ann Trail is located in the City of Leonard in Oakland County, Michigan. The equestrian trail is approximately 3200' long and begins at Elmwood Street and ends at Gerst Road.



Polly Ann Equestrian Trail

Oakland County, Michigan



Statement of the Problem

A portion of the Polly Ann Trail runs through of the Village Leonard in northern Oakland County. Approximately 3,200 linear feet of the trail in this area has been paved with a 12 foot width. Polly Ann Trail is a mixed use trail serving all forms of non-motorized users, including equestrians, and the equestrians would prefer to not ride on a bituminous paved trail.

The newly paved trail is centered on the former 50 foot wide railroad right-of-way. There are a variety of site conditions adjacent to the trail along its length. There are areas of fairly level open grass; fairly level areas with heavy undergrowth; areas that are poorly drained; areas that are higher than the trail, but wide enough for equestrian trail consideration; and areas of steep side slopes with a level shoulder area adjacent to the existing trail.

The primary intent of this assignment is to plan and design an appropriate location for an equestrian trail, which will perimeter the paved trail providing approximately 4 feet 6 inches of width. Given the diversity of existing site conditions, the initial program will consider proposing a variety of differing trail types. These alternative equestrian trail types will consider a variety of surfacing materials; drainage considerations; and edging methods depending on the dictates of the specific site considerations. The intent of this program is to provide an appropriate, safe and logical perimeter equestrian trail with the advantage and opportunity to evaluate an alternative equestrian trail surfaces and techniques. A monitoring program should evaluate and report on the optimum methods utilized within this area. The intent is to formulate appropriate and logical guidelines that can be utilized in other areas for equestrian trail improvements.

This assignment will initiate with the development of design details for the construction and development of alternative trail construction techniques. These alternatives will be evaluated and the appropriate details will be utilized along this portion of trail. The design team will carefully evaluate the on-site conditions and recommend the various trail construction methods for specific sections along the trail. A detailed cost projection will be prepared for each of the construction methods relating its length and appropriate site preparation for implementation. Design plans will be prepared, which illustrate the site specific trail construction techniques associated with the proposed construction details which the cost estimate is based upon.

Following appropriate reviews, professional services will continue with development of final plans, Phase 500 Task, and Phase 600 and 700, construction administration, office and field services.

Existing Site Photographs

Site photographs were taken on the initial site visit to evaluate the possible locations for the equestrian trail. Based upon this review, the west side of the existing shared use path was chosen as the best location for the equestrian trail due to the vegetation and severe grade change on the east side as shown in the following photographs.



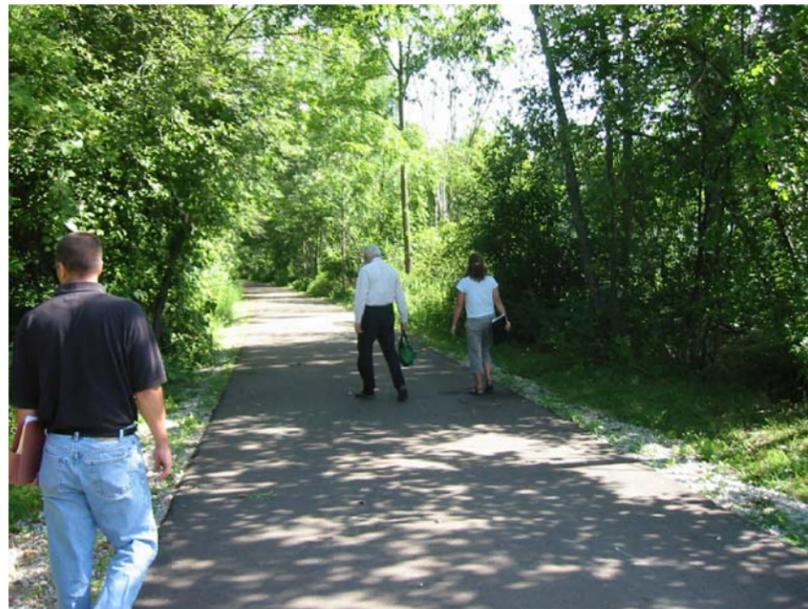
**VIEW OF EXISTING BITUMINOUS TRIAL
AT LEONARD ROAD LOOKING NORTH**



**VIEW OF EXISTING BITUMINOUS
TRIAL LOOKING NORTH**



**VIEW OF WEST SIDE OF BITUMINOUS
TRIAL LOOKING SOUTH**



**VIEW OF EXISTING BITUMINOUS
TRIAL LOOKING NORTH**



**VIEW OF EAST SIDE OF EXISTING
BITUMINOUS TRIAL LOOKING NORTH**



**VIEW OF EXISTING BITUMINOUS TRIAL
AT GERST ROAD LOOKING SOUTH**

**Existing Site Photographs
POLLY ANN EQUESTRIAN TRAIL
MICHIGAN DEPARTMENT OF NATURAL RESOURCES**



Materials Test Photographs

Following the initial site visit, it was determined that various materials have been used as surfacing for equestrian trails. Since no one material was deemed as the best, M.C. Smith produced six different examples of test mixes. These included 50% soil, 50% sand; 50% sand, 50% chips and fines; 50% chips and fines, 50% sand; 50% soil, 50% chips and fines and a sample of just chips and fines and one of wood fiber surfacing. These samples were assembled in a 4" layer and then water was added to test for drainage. The samples were presented to Mark Mandenberg - Non-motorized Trails Specialist, Recreation & Trails Section Forest, Mineral & Fire Management of the Michigan Department of Natural Resources; Rob Gruesbeck - Project Director, Facilities Administration, Construction Division of the Department of Management and Budget Design and Amy Murray - Trail Manager of the Polly Ann Trailway Management Council, Inc. at the second site visit and it was determined that the chips and fines did not drain well, so it would not be a material used on the trail. The remaining materials will be used in the appropriate locations along the trail to determine which material is best suited for future trail developments.



**Materials Test Photographs
POLLY ANN EQUESTRIAN TRAIL
MICHIGAN DEPARTMENT OF NATURAL RESOURCES**



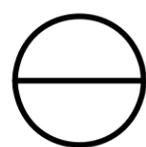
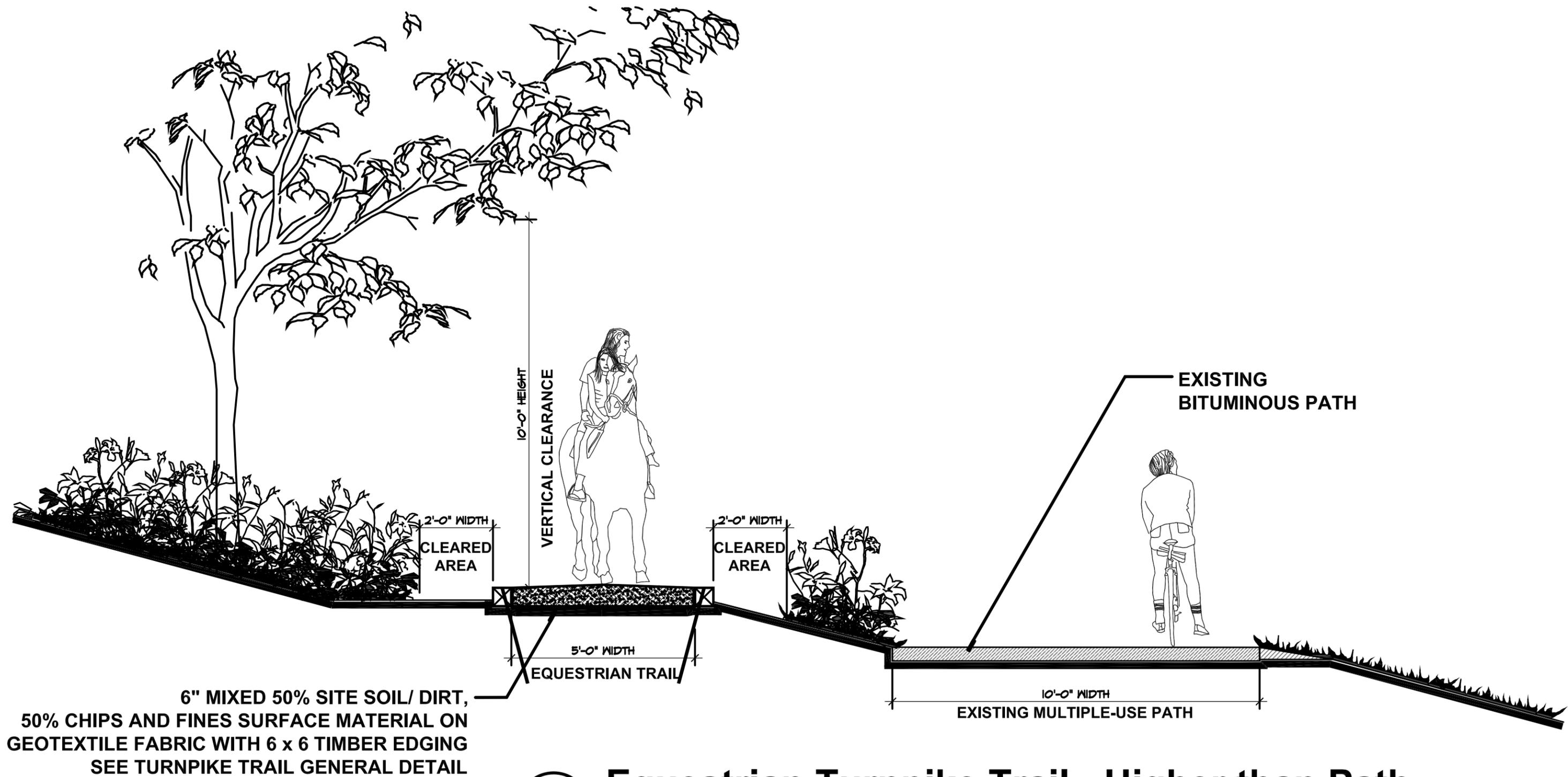
Site Visit Summary

An initial site visit took place on August 17, 2006 and was attended by Mark Mandenberg, Rob Gruesbeck, Amy Murray, Michael Smith and Tiffany Smith. At that time we evaluated the condition of the site, specifically the area adjacent to the existing bituminous path. Because the grade adjacent to the path in some areas was flat, some lower than the path and some higher than the path, the design for the material for the equestrian trail will need to vary depending on the elevation, density of material and wetness of soil. The conclusion was made among the group to test a variety of materials at different elevations in this stretch of the Polly Ann Trail to determine which material works the best for equestrian trail use.

The second site visit took place on December 13, 2006 and was attended by Mark Mandenberg, Rob Gruesbeck, Amy Murray, Michael Smith and Tiffany Smith. At this meeting M.C. Smith presented the various materials which could be used for the trail. A materials cost estimate was presented that included costs for each material per linear foot. It was determined that the straight Chips and Fines mixture did not drain well and this would not be used as a test mixture. An additional material of recycled wood chips will be added to the test as they are available as a donation. At this meeting, the exact location of each material and its relation to the bituminous path was determined.

Design Details

Included in the design details for the possible locations and configuration of the equestrian trail are trails higher, lower, level and adjacent to the existing bituminous path. The test mixtures will be placed in areas best suited to work with existing site conditions. In addition, a standard detail for a turnpike trail that will be used in most situations follows.



Equestrian Turnpike Trail - Higher than Path

Scale: 3/8"=1'-0"

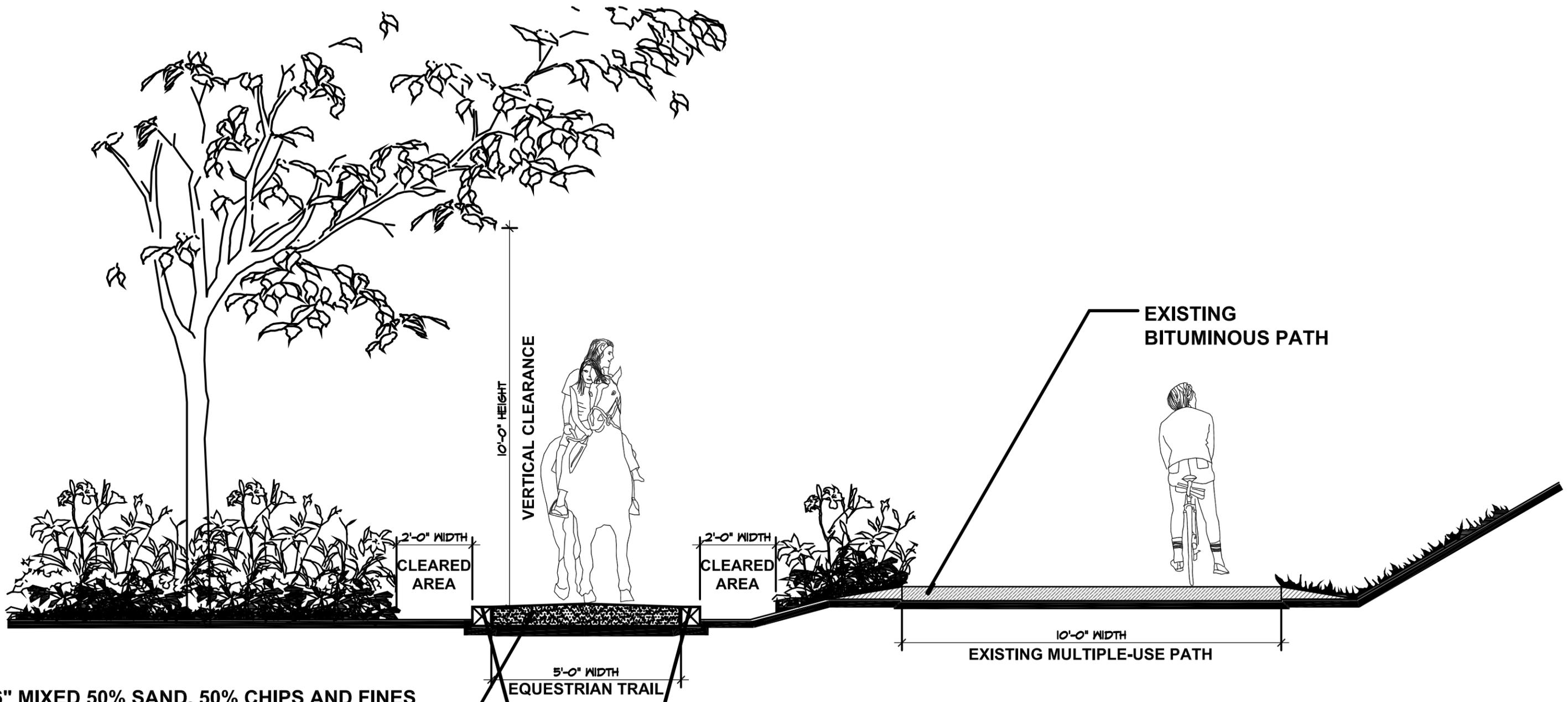
Design Details

POLLY ANN EQUESTRIAN TRAIL

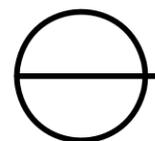
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6" MIXED 50% SAND, 50% CHIPS AND FINES
 SURFACE MATERIAL ON GEOTEXTILE FABRIC
 WITH 6 x 6 TIMBER EDGING
 SEE TURNPIKE TRAIL GENERAL DETAIL



Equestrian Turnpike Trail - Lower than Path

Scale: 3/8"=1'-0"

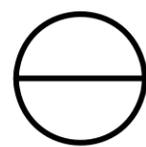
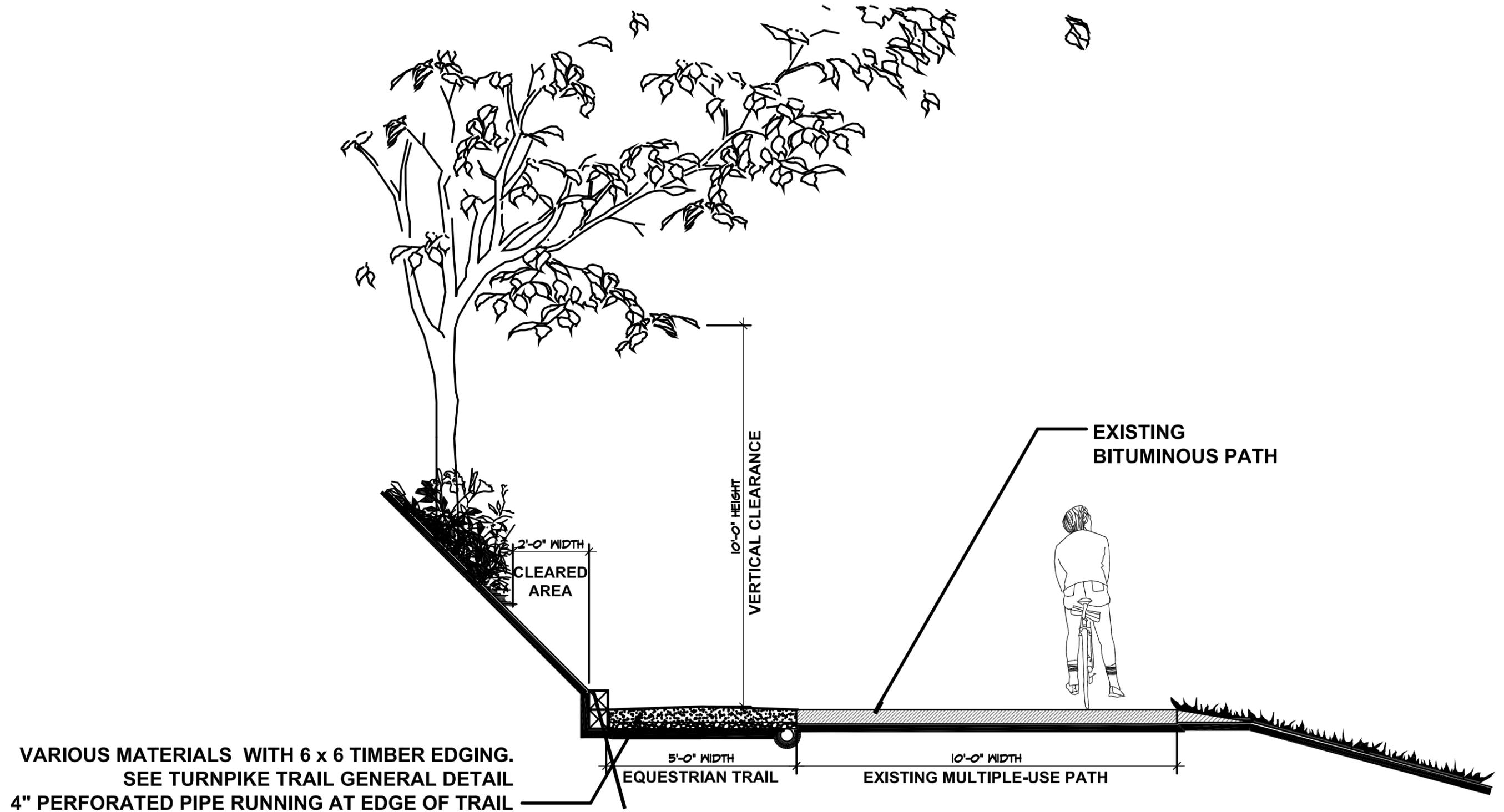
Design Details

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Equestrian Trail - Adjacent to Path

Scale: 3/8"=1'-0"

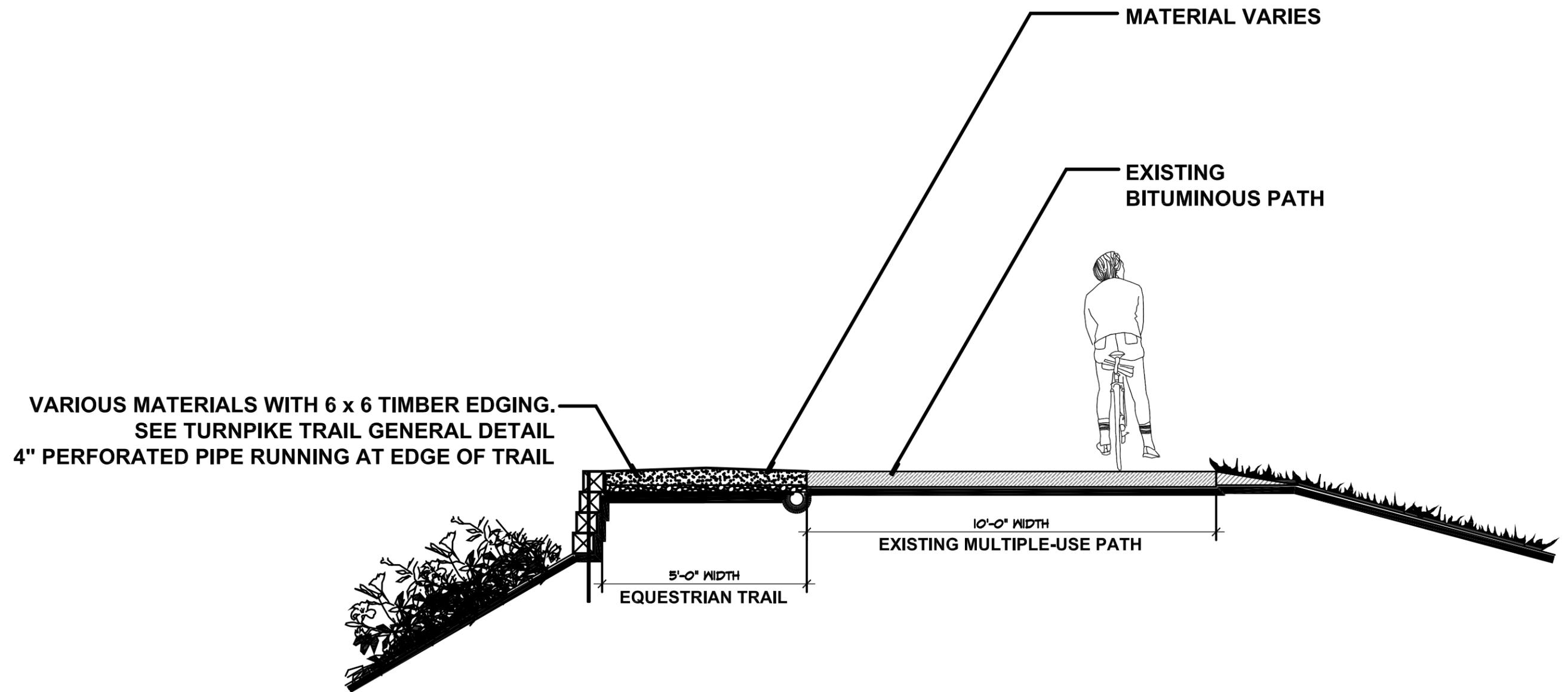
Design Details

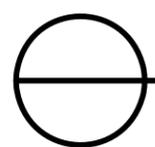
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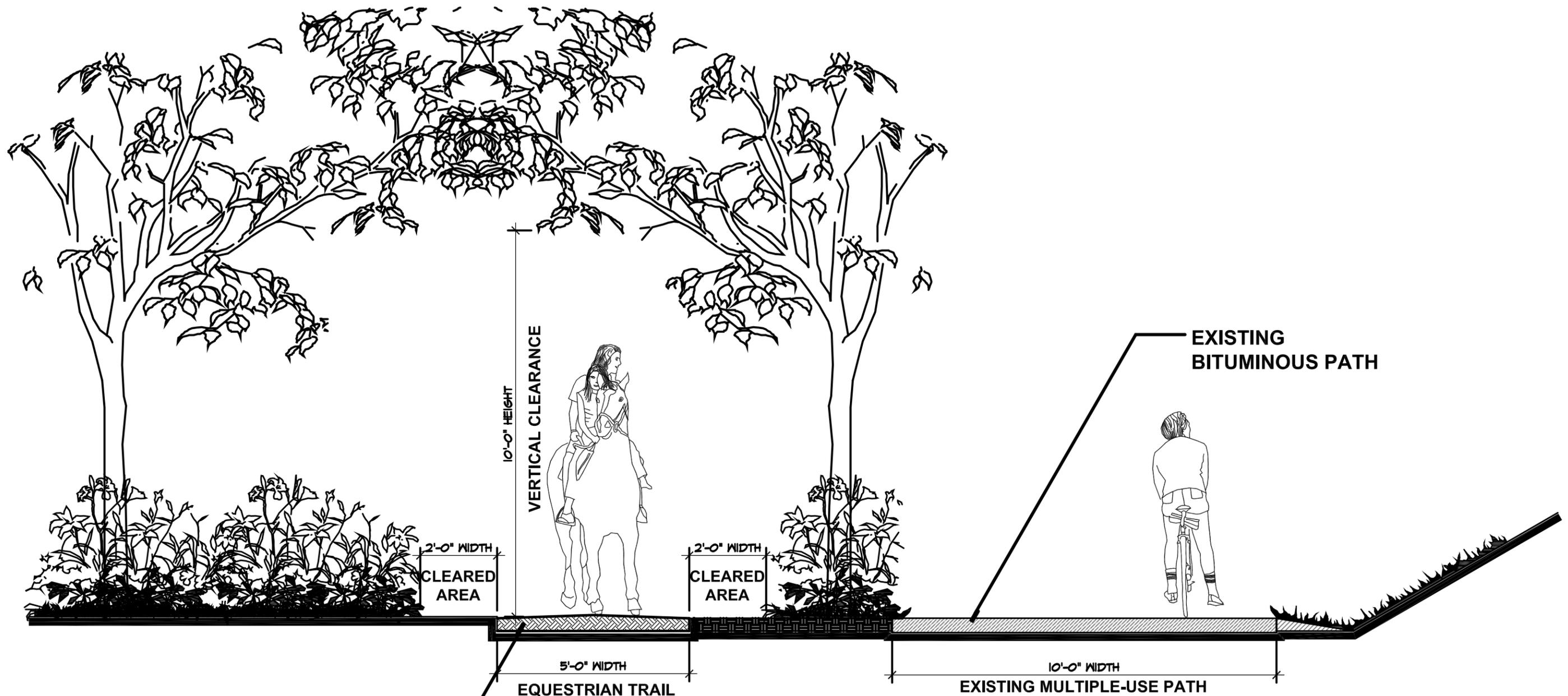



Equestrian Trail - Adjacent to Path
 Scale: 3/8"=1'-0"

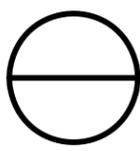
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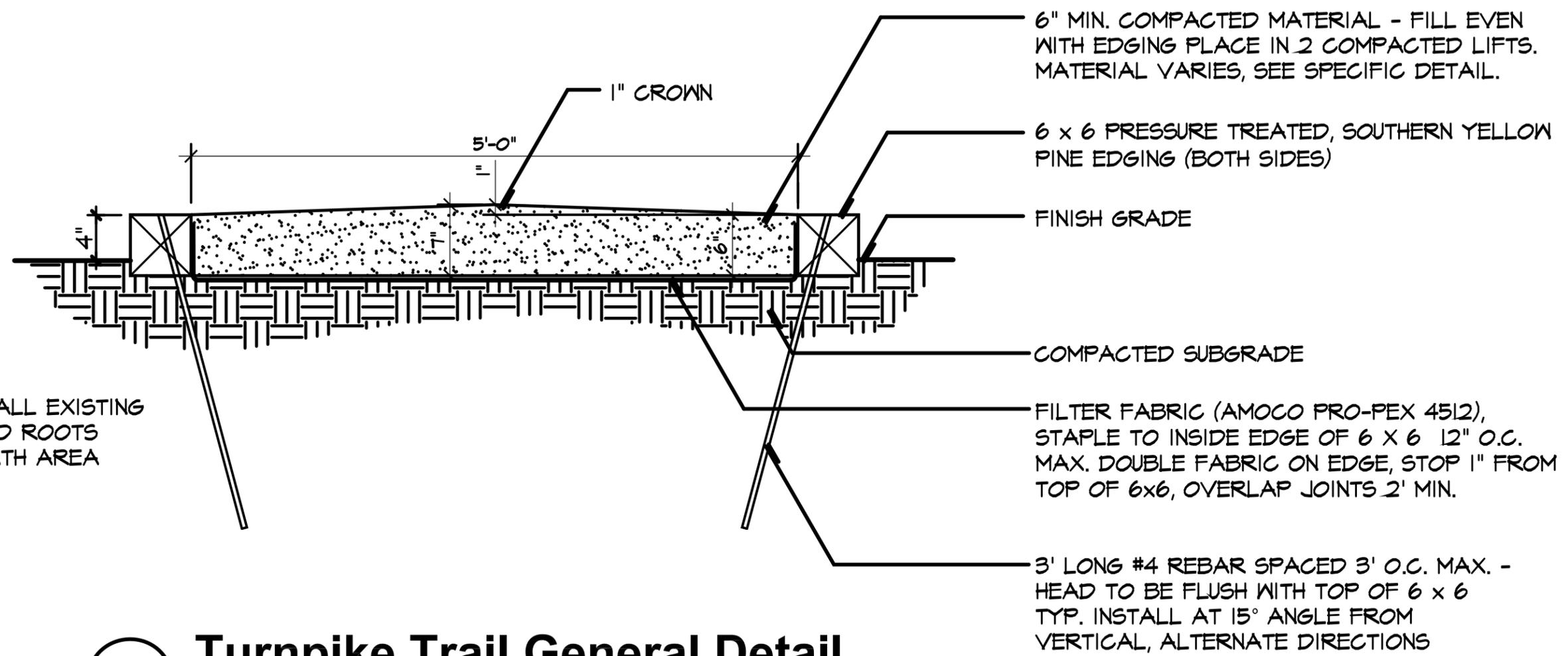
NATURAL EXISTING SITE SOIL
WITH DEFINED TRAIL EDGE
WITHOUT GEOTEXTILE FABRIC



Equestrian Trail - Level with Path

Scale: 3/8"=1'-0"

Design Details
POLLY ANN EQUESTRIAN TRAIL
MICHIGAN DEPARTMENT OF NATURAL RESOURCES



NOTE: REMOVE ALL EXISTING VEGETATION AND ROOTS FROM UNDER PATH AREA

Turnpike Trail General Detail
 Scale: 1"=1'-0"

Preliminary Trail Layout

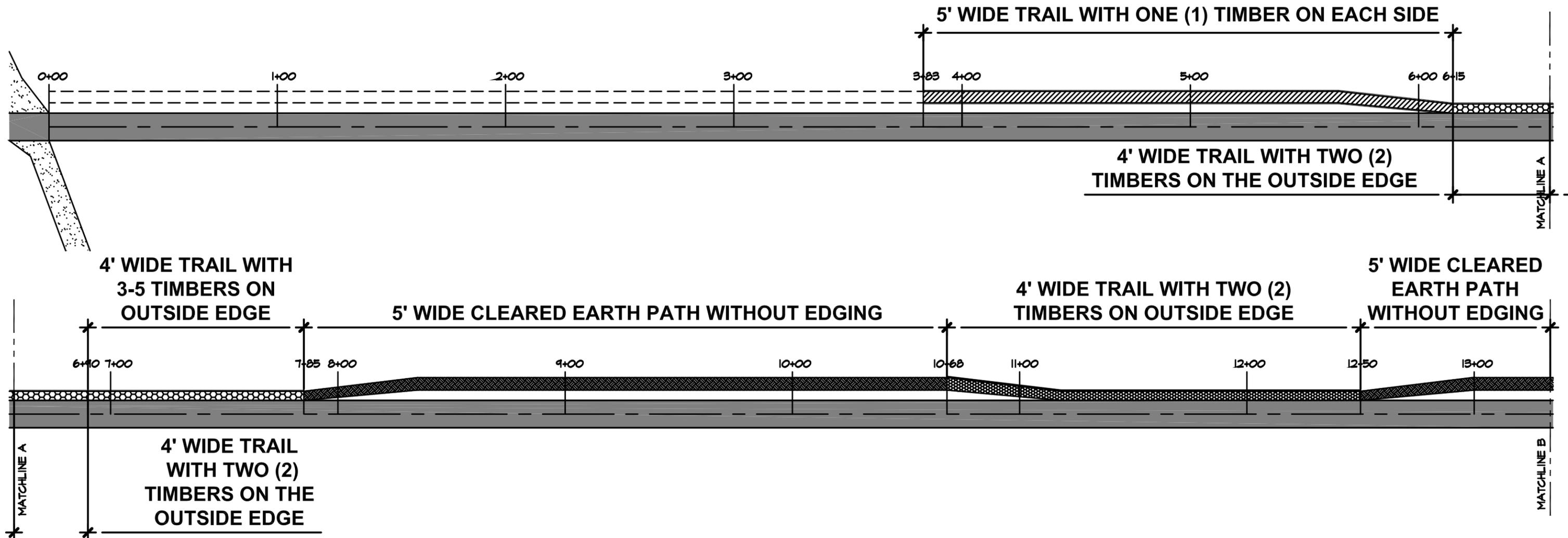
Polly Ann Equestrian Trail

Oakland County, Michigan



LEGEND

- UNIMPROVED TRAIL WITH CONFIDENCE MARKERS EVERY 100 FEET
- A  50% SAND/ 50% CHIPS AND FINES
- B  50% SITE SOIL/ 50% CHIPS AND FINES
- C  50% SAND/ 50% SITE SOIL
- D  SITE SOIL
- E  WOOD FIBER SURFACING
- F  RECYCLED WOOD CHIPS



**Conceptual Trail Layout
POLLY ANN EQUESTRIAN TRAIL
MICHIGAN DEPARTMENT OF NATURAL RESOURCES**

0 250 500 1000 1500 2000



SCALE: 1" = 500'

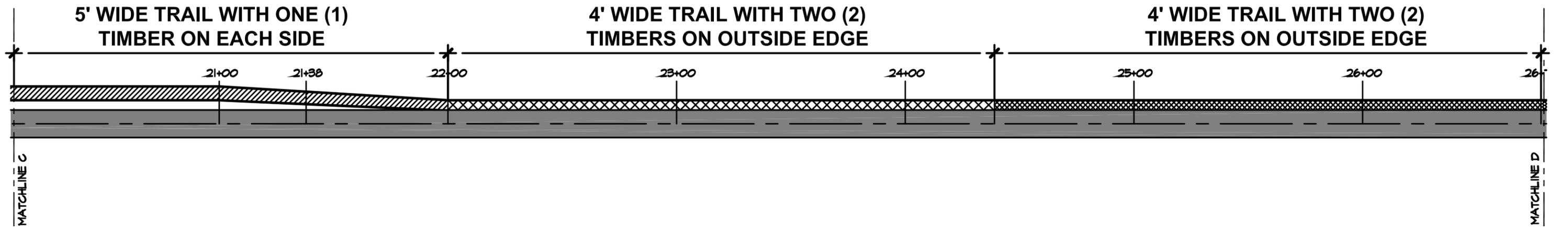
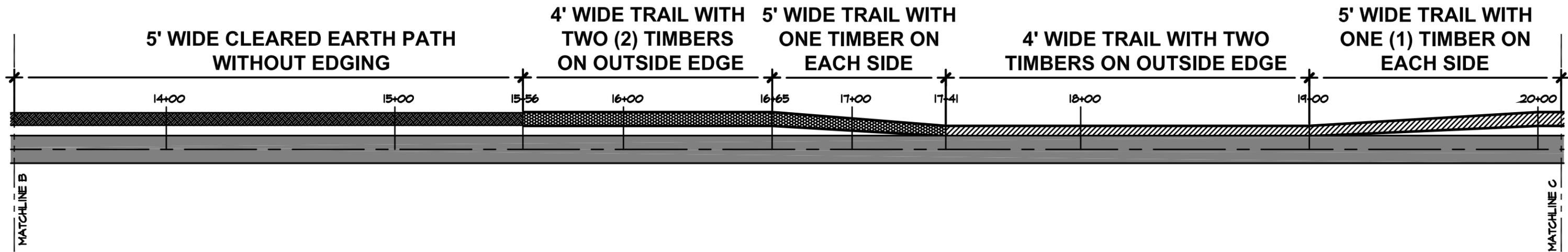
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LEGEND

- UNIMPROVED TRAIL WITH CONFIDENCE MARKERS EVERY 100 FEET
- A  50% SAND/ 50% CHIPS AND FINES
- B  50% SITE SOIL/ 50% CHIPS AND FINES
- C  50% SAND/ 50% SITE SOIL
- D  SITE SOIL
- E  WOOD FIBER SURFACING
- F  RECYCLED WOOD CHIPS



**Conceptual Trail Layout
POLLY ANN EQUESTRIAN TRAIL
MICHIGAN DEPARTMENT OF NATURAL RESOURCES**

0 250 500 1000 1500 2000

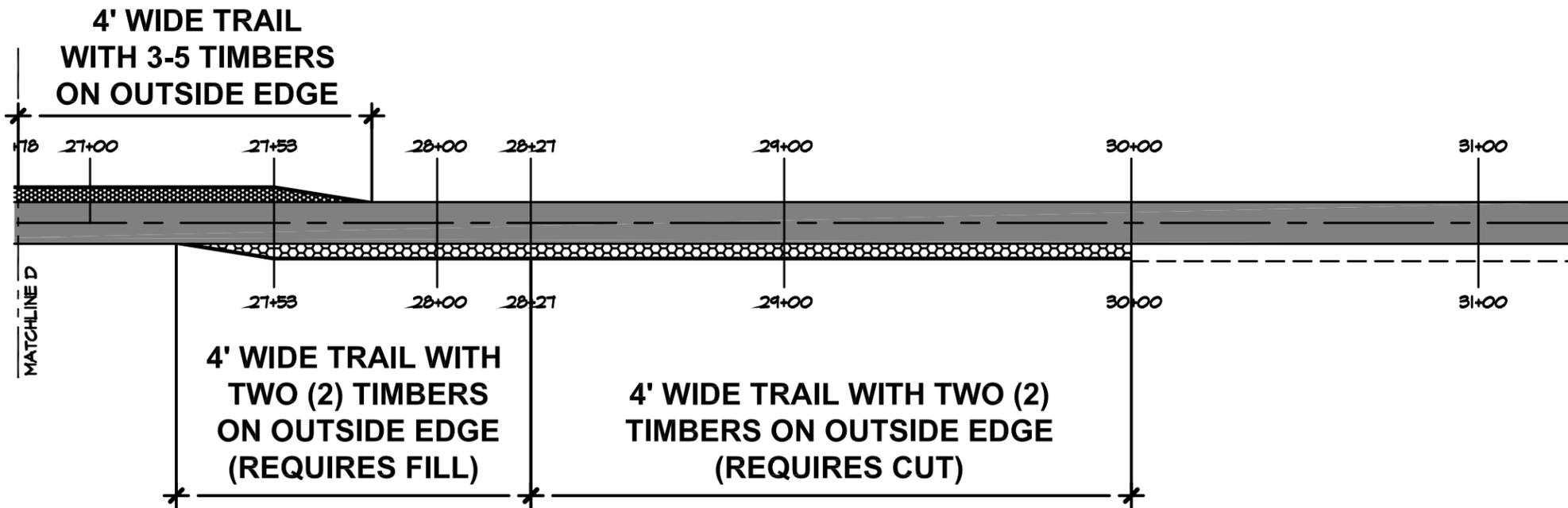


SCALE: 1" = 500'

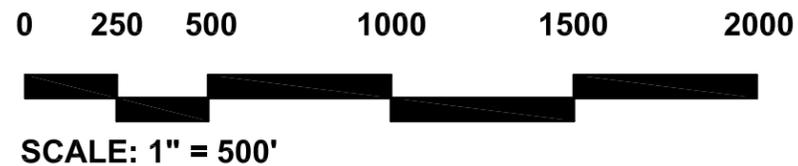


LEGEND

- | | | | | | |
|---|--------|---|---|---------|----------------------|
| | ----- | UNIMPROVED TRAIL WITH
CONFIDENCE MARKERS
EVERY 100 FEET | E | XXXXXXX | WOOD FIBER SURFACING |
| A | //// | 50% SAND/ 50% CHIPS AND FINES | F | XXXXXX | RECYCLED WOOD CHIPS |
| B | XXXXXX | 50% SITE SOIL/ 50% CHIPS AND FINES | | | |
| C | XXXXXX | 50% SAND/ 50% SITE SOIL | | | |
| D | XXXXXX | SITE SOIL | | | |



**Conceptual Trail Layout
POLLY ANN EQUESTRIAN TRAIL
MICHIGAN DEPARTMENT OF NATURAL RESOURCES**



Order of Magnitude Cost Estimate

POLLY ANN EQUESTRIAN TRAIL
Michigan Department of Natural Resources
 Order of Magnitude
 January 15, 2007

ALL COSTS EXPRESSED IN LINEAR FEET

	<u>Materials</u>	<u>Cost</u>	<u>Clearing, Removals and Grading</u>	<u>Timber Edging</u>	<u>Filter Fabric</u>	<u>4" Perforated Pipe</u>	<u>Total Cost (LF)</u>	<u>Total Distance (LF)</u>	<u>Total Cost</u>
A	50% Sand/ 50% Chips and Fines with (3) Timber Barriers Adjacent to Path	\$6.00	\$6.50	\$15.75	\$1.25	\$5.00	\$34.50	159	\$5,485.50
A	50% Sand/ 50% Chips and Fines with (2) Timber Barriers Separated from Path	\$6.00	\$8.50	\$13.00	\$1.25	NA	\$28.75	300	\$8,625.00
	Subtotal 50% Sand/ 50% Chips and Fines							459	\$14,110.50
B	50% Site Soil/ 50% Chips and Fines with Single Timber Border Separated from Path	\$7.00	\$8.50	\$13.00	\$1.25	NA	\$29.75	232	\$6,902.00
B	50% Site Soil/ 50% Chips and Fines with (3) Timber Barriers Adjacent to Path	\$7.00	\$6.50	\$15.75	\$1.25	\$5.00	\$35.50	322	\$11,431.00
B	50% Site Soil/ 50% Chips and Fines with (4) Timber Barriers Adjacent to Path	\$7.00	\$6.50	\$26.75	\$1.25	\$5.00	\$46.50	95	\$4,417.50
	Subtotal 50% Site Soil/ 50% Chips and Fines							649	\$22,750.50
C	50% Sand/ 50% Site Soil with (3) Timber Barriers Adjacent to Path	\$6.00	\$6.50	\$15.75	\$1.25	\$5.00	\$34.50	257	\$8,866.50
	50% Sand/ 50% Site Soil with (4) Timber Barriers Adjacent to Path	\$6.00	\$6.50	\$22.25	\$1.25	\$5.00	\$41.00	109	\$4,469.00
	50% Sand/ 50% Site Soil with (2) Timber Barriers Separated from Path	\$6.00	\$8.50	\$22.25	\$1.25	NA	\$38.00	76	\$2,888.00
	Subtotal Wood Surfacing							442	\$16,223.50
D	Site Soil Separated from Path	NA	\$8.50	NA	NA	NA	\$8.50	589	\$5,006.50
	Subtotal Site Soil Surfacing							589	\$5,006.50
E	Wood Fiber Surfacing with (3) Timber Barriers Adjacent to Path	\$7.00	\$6.50	\$15.75	NA	\$5.00	\$34.25	239	\$8,185.75
F	Recycled Wood Chip Surfacing with (3) Timber Barriers Adjacent to Path	NA	\$6.50	\$15.75	NA	\$5.00	\$27.25	239	\$6,512.75
	Subtotal Wood Surfacing							478	\$14,698.50
	Total Constructed Path Distance							2617	
	Subtotal								\$72,789.50
	Construction Contingencies (10%)								\$7,278.95
	Professional Fees for Phase 500, 600 and 700 Services								\$10,778.90
	Total Cost								\$90,847.35