Appendix C
Malin Road Extension Study (2010)
Implementation Plan

5. Performance Measures

Various performance measures were evaluated for the potential roadway alignments and compared to the no-build condition. The no-build condition summarizes the impacts of not providing either of the new roadway extensions; however, under this condition low-cost safety improvements to Warren Avenue (and potentially other local roadways) could be pursued to better accommodate traffic along existing routes. These improvements, however, would not achieve the objectives of the new roadway alignments scenarios unless more extensive improvements were provided that would also accommodate truck and bus traffic between Lancaster Avenue and Pennsylvania Avenue, Quaker Lane, and the Malvern train station.

Measures of Effectiveness

Table 7 summarizes the measures of effectiveness of the study alternatives noted above. Categories related to 1) traffic and access issues, 2) safety and alternative travel modes, 3) community character issues, 4) environmental issues, and 5) costs. It is noted that the costs of the project are more thoroughly described in Section 6 of this study and that several of the performance measures will need further evaluation during future phases of the project. As shown in Table 7, this study demonstrates that the Malin Road extension, as well as the Three Tun Road extension, achieve the overall goals of the study while, in contrast, the future no-build, (or current access routes to the study area) do not achieve these goals.

Table 7 | Measures of Effectiveness Comparison Matrix

	Measure of Effectiveness	Do Nothing (No Extensions)	New Roadway Alignments: Scenario 1 Malin Road Extension	New Roadway Alignments: Scenario 2 Three Tun Road Extension
Traffic & Access	Peak Hour Levels of Service (LOS)	↓ LOS at study area intersections will worsen without new road extensions or other improvements.	↑ The overall LOS at most of the study intersections improves.	↑ The overall LOS at most of the study intersections improves.
	Reduction in Vehicle Miles Traveled (VMT)	↓ No change to VMT.	↑ Reduction of 0.7 miles between U.S. Route 30 west of PA Route 320 and Malvern train station.	↑ Reduction of 0.7 miles between U.S. Route 30 west of PA Route 320 and Malvern train station.
	Travel Time Savings	↓ Travel times along existing routes will increase due to background traffic growth and congestion.	↑ Travel times improve with more direct route.	↑ Travel times improve with more direct route.
	Reduction in ADT on local roads	↓ No reductions to ADT on local roads.	↑ Reductions on most local roads including Warren Avenue (-1,400 ADT) and King Street (-700 ADT). ↓ ADT could increase on Malin Road (north of Lancaster Avenue) by about 850 vehicles.	↑ Reductions on most local roads including Warren Avenue (-1,500 ADT) and King Street (-900 ADT). ↓ ADT could increase on Malin Road (north of Lancaster Avenue) by about 850 vehicles.
	Reduction in Heavy Vehicle ADT on local roads	↓ Heavy vehicles will continue to use local roads without weight restrictions.	↑ Heavy vehicles to/from study area have an improved route and do not need to utilize Bridge or Broad Streets.	↑ More direct route provided between Borough, as well as Three Tun business park, and Lancaster Avenue and other major arterials
Safety & Alternative Travel	Sidewalk/trails	↓ Limited facilities outside of Borough. Provision of new pedestrian facilities will result in more property impacts (compared to minor roadway upgrades).	↑ Yes (4,700 feet of new sidewalk/trail proposed on extension). Could tie into future planned Patriot's Path trail. ↓ New (and costly) pedestrian tunnel required under Norfolk Southern rail line.	↑ Yes (2,600 feet of new sidewalk/trail proposed on Three Tun Road extension.)
	Bicycle Access	↓ No defined routes/facilities. Provision of new bicycle facilities will result in more property impacts (compared to minor roadway upgrades).	↑ Paved shoulders/trail provided. Could tie into future planned Patriot's Path trail.	↑ Paved shoulders/trail provided. Could tie into future planned Patriot's Path trail.
	Public Transportation	↓ Circuitous routes for public transportation to Malvern Station and industrial uses. Truck/bus restrictions on Warren Avenue.	↑ New road can accommodate public transportation and provide direct route.	↑ New road can accommodate public transportation and provide direct route.
	Transit-Oriented Development (TOD)	↓ Circuitous access route and unaddressed traffic congestion do not support TOD.	↑ Supports access to TOD and near Malvern Station can accommodate new development.	↑ Supports access to TOD and near Malvern Station can accommodate new development.
Community Character	Historic Resources & Community Facilities	■ No impacts, but potential Warren Avenue upgrades could impact historic resources.	↑ No impacts identified.	↑ No impacts identified.
	Businesses (direct impact)	■ No impacts; however, regional traffic improvements may impact businesses outside the immediate study area.	↓ Right-of-way/property required from several businesses including five lots on Pennsylvania Avenue cul-de-sac.	↓ Right-of-way/property required from several businesses including two or three lots on Three Tun Road cul-de-sac.
	Residences (direct impact)	■ No impacts, but potential Warren Avenue upgrades could impact several properties.	↓ Right-of-way at rear of 16 properties required.	↑ No impacts.
	Land Use	■ No impacts.	↑ No major conflicts with CCPC's *Landscapes2* Plan or local comprehensive plans.	↑ No major conflicts with CCPC's *Landscapes2* Plan or local comprehensive plans.

Table 7 continued.

	Measure of Effectiveness	Do Nothing	New Roadway Alignments Scenario 1 Malin Road Extension	New Roadway Alignments Scenario 2 Three Tun Road Extension
ENVIRONMENTAL	**Wetlands**	No impacts.	No NWI wetlands have been identified in the project area; however, soils with partially hydric components are present and may require wetland delineations.	No NWI wetlands have been identified in the project area; however, soils with partially hydric components are present and may require wetland delineations.
	Agricultural Resources	No impacts.	No Productive Agricultural Land is present but there is Prime Farmland soil and soils of Statewide importance are present.	No Productive Agricultural Land is present but there is Prime Farmland soil and soils of Statewide importance are present.
	Stream Crossings	No impacts.	Little Valley Creek and an unnamed tributary, both designated as Exceptional Value and for Migratory Fishes, will be crossed.	Little Valley Creek and an unnamed tributary, both designated as Exceptional Value and for Migratory Fishes, will be crossed.
	Floodplains	No impacts.	No FEMA designated 100-yr floodplains are present within the project study area.	No FEMA designated 100-yr floodplains are present within the project study area.
	Air Quality	No impacts. Increased traffic congestion in future without roadway extensions or without improvements may result in negative impacts to air quality.	N/A – impacts to air quality will have to be evaluated in future studies, but may improve or not worsen due less traffic congestion.	N/A – impacts to air quality will have to be evaluated in future studies, but may improve or not worsen due less traffic congestion.
	Noise	No impacts.	N/A – noise impacts will need to be evaluated in future studies/design.	N/A – noise impacts will need to be evaluated in future studies/design.
	Hazardous Waste	No impacts.	N/A – a more detailed review of hazardous waste sites is necessary during future studies/design.	N/A – a more detailed review of hazardous waste sites is necessary during future studies/design.
	Threatened & Endangered Species	No impacts.	N/A – coordination with U.S. Fish and Wildlife Service is required to determine impacts.	N/A – coordination with U.S. Fish and Wildlife Service is required to determine impacts.
COSTS	**Total Project Costs** *Costs may vary depending on funding source*	$0 but does not include improvements to intersections/roadways required as a result of background traffic growth. Low-cost safety improvements/upgrades to Warren Avenue are estimated to cost approximately $1.5 Million.	Estimated to be in the order of $15 to $19 Million for the extension. Improvements to Pennsylvania Avenue (and at Pennsylvania/ Warren Ave intersection) include an additional $2 to $2.5 Million	Estimated to be in the order of $8.8 to $11 Million.
SUMMARY	**Satisfies Project Goals & Objectives**	**No.** Does not provide a desirable alternative route for trucks and buses, does not reduce neighborhood traffic volumes, and does not support future TOD near train station.	**Yes.** Provides alternative route for trucks/bus traffic, reduces traffic from neighborhood roads, and supports future TOD near train station.	**Yes.** Provides another route for trucks/bus traffic, can further reduce traffic from neighborhoods, and supports TOD near train station.

FROM MALIN ROAD EXTENSION FEASIBILITY STUDY
(DECEMBER 2010)

6. IMPLEMENTATION PLAN

This section discusses a potential plan for implementing the new roadway extensions of Malin Road and Three Tun Road, including possible funding and design/engineering/approval processes. Because funding availability and sources can change rapidly, as can design/engineering/approval processes over time, it is recommended that the implementation and action items be reviewed periodically if Malvern Borough and East Whiteland Township purse these projects in order to assure that the most desirable implementation plan and action items are being undertaken.

Funding Options

At this time, there are significant uncertainties regarding future funding for transportation infrastructure at all levels of government. The current federal transportation authorization bill (SAFETEA-LU) has expired, so future federal funding levels, project eligibility, and selection criteria are uncertain at this time. Similarly, the federal ruling to prohibit tolling on I-80 has led to an immediate decrease in state funding levels and uncertainty about the future of state funding for transportation. As a result of these funding limitations, several major projects in the DVRPC region have been deferred, few new projects are being initiated, and there is considerable competition for any available resources. In particular, the region has prioritized maintaining and improving the existing transportation system, so funding for new facilities is extremely competitive.

The lack of funding and significant cost presents a challenge for implementing the Malin Road extension project. It will likely require a compilation of various funding sources. Below are some current funding options that can be considered for this project:

- **Traditional federal and state transportation funds**
  - Dependent upon future legislation and programs at the federal and state levels.
  - Likely opportunities will be from competitive programs, such as Transportation Enhancements (TE) or Pennsylvania Community Transportation Initiative (PCTI).
  - Requires programming on DVRPC's Transportation Improvement Program (TIP).
  - Potential steps and schedule:

1. Project approved on updated TIP	24 months
2. Request for proposal for design services	2 months
3. Design consultant selection process approved by PennDOT	6-12 months
4. Preliminary Engineering State (includes environmental)	18-36 months
5. Final Design State (includes R/W acquisition)	24-48 months
6. Submission of Plans, Specification and Estimate (PS&E)	2 months
7. PennDOT construction letting date	3 months
8. Notice to proceed to contractor	2 months

- **Municipal funds**
  - Bond funds or impact fees.
  - Potential steps and schedule:

1. Secure construction funding from grants	12 months
2. Request for proposal for design services	2 months
3. Design consultant selection process approved by municipality	2 months
4. Engineering and R/W acquisition	24 months
5. Approval of environmental permits	12 months
6. Advertise and approval of bids for construction	3 months
7. Notice to proceed to contractor	2 months

- **Private/Developer funds**
  - Opportunities for public-private partnerships with contributions from both sectors.
  - Requires agreement between the municipality and developers.
  - Potential steps and schedule:

1. Approval of PPP agreement	24 months
2. Request for proposal for design services	2 month
3. Design consultant selection process	2 months
4. Engineering and R/W acquisition	24-36 months
5. Approval of environmental permits	12 months
6. Advertise and approval of bids for construction	3 months
7. Notice to proceed to contractor	2 months

Engineer's Conceptual Opinion of Cost

The feasibility study provides an engineer's opinion of cost for the potential improvements identified in this study. The costs are based on the conceptual engineering plans, details and exhibits. The opinion of cost for the Malin Road Extension is in the range of $15,000,000 to $19,000,000 and in the order of $8,800,000 to $11,000,000 for the Three Tun Road extension. The opinion of cost for the Pennsylvania Avenue improvements, including improvements at its intersection with Warren Avenue, is in the order of $2,000,000 to $2,500,000. A detailed cost breakdown for each improvement project area is provided in Appendix E, and the detailed cost breakdown includes estimated total construction costs, engineering/permitted costs, construction inspection, utility relocation and right-of-way acquisition costs. Also, the opinion of construction costs during the preliminary and final design state.

Due to the high cost of the roadway extension, it is recommended that if the project was to move forward with the support of Malvern Borough and East Whiteland Township, that it may be most practical to consider completing the project in sections, as described below. In addition, the Borough and Township should continue their planning efforts if the project is anticipated to one day move forward, and as such, this section provides a summary of actions the municipalities should address.

Project Priorities

Due to the scope, costs, and funding challenges associated with the implementation of the roadway extensions, it is anticipated that the new roadways could be completed in sections. This study identifies a potential prioritization of improvements for the purposes of developing a recommended implementation plan; however, this assumed prioritization may change in the future based on a variety of conditions and needs of the municipalities. It is assumed that the improvements to Pennsylvania Avenue and intersection improvements at the intersection with Warren Avenue could be completed first in order to set the foundation for the future Malin Road

extension and to support redevelopment (including potential TOD projects) in the study area. Next, construction of the Malin Road extension to Pennsylvania could occur. The construction of the Three Tun Road extension, as this roadway extension has the least constraints and costs compared to the Malin Road extension, could occur independently of the Malin Road extension or in conjunction with that extension although the improvements to Malin Road and its intersection with Lancaster Avenue would be required if this portion of the project proceeds first.

The following are project implementation and funding options for implementing the highway improvements identified in this study. Again, the funding opportunities, implementation processes, and schedules are subject to change based on a variety of factors and should be reevaluated as this project moves to future stages. Also, it is noted that it likely that funding for the project, or portions thereof, may be obtained from a combination of sources which may also impact implementation processes and schedules.

- **Pennsylvania Avenue and Warren Avenue Improvements -** These improvements will include partial reconstruction, additional drainage installation, sidewalk installation along Pennsylvania Avenue, bituminous overlay, intersection improvements at Warren Avenue (as previously noted) and pedestrian improvements along Warren Avenue. It is assumed that these improvements would be completed in advance of implementing the Malin Road Extension.

- **Malin Road Extension -** The portion of the project will include new roadway construction of the Malin Road extension, traffic signalization and improvements at the Pennsylvania Avenue/Warren Avenue intersection and improvements at the Lancaster Avenue/Malin Road intersection, and construction of the pedestrian tunnel. It is noted that the new pedestrian tunnel under the Norfolk Southern rail line is a significant cost item for this project phase. If the pedestrian tunnel was not provided, provided at a different location such as a potential future crossing associated with the Patriot's Path project, or simply deferred until a future date when additional pedestrian facilities are provided along Lancaster Avenue or additional funding is secured, then the cost of the Malin road Extension could be reduced.

- **Three Tun Road Extension -** This portion of the project will include intersection improvements at PA Route 352 (and at Lancaster Avenue if this extension occurs before the Malin Road extension), as previously noted, mill and overlay for existing Three Tun Road, traffic signalization, reconstruction of existing Malin Road and new roadway construction.

  There is potential for the individual applicants (i.e., municipalities, land developers, etc.) to construct segments of the new roadway extensions and associated roadway improvements, as noted above. However, it should be considered that constructing phased segments of the roadway extensions presents many design, permitting and constructability issues as a result of the existing terrain, stream crossings and the unique design of the extension road. For example, an interim grading condition would be needed to balance the extreme elevation differences within the large cut and fill sections such as the segment of the Malin Road extension through the Malin Road Associates property.

Action Plan

Due to the magnitude of the needed improvements associated with the new roadway extensions, numerous resources will need to be identified, mobilized, and synchronized in order to implement these improvements. Therefore, it is important that an initial action plan be clearly identified and put into use immediately (if the Borough and Township plan to pursue this project) in order to lay the groundwork for future transportation. If this project moves forward, like the overall implementation plan, these action plan tasks should be re-evaluated periodically.

The action plan, or implementation process, for this project is broken down in four categories: 1) organizational, 2) regulatory, 3) finance, and 4) future studies/engineering, and as follows:

- **Organizational -** For this project, there are two municipalities as well as other stakeholders, property owners, and neighborhoods that will need to work in a concerted effort to implement this project. A mutual "partnership" among the municipalities and stakeholders will be needed with the understanding that these improvements will need to occur gradually over time and potentially in stages (as previously described).

Initial Action Items	**Responsible Parties/Leaders**
a. Adopt/endorse this feasibility study and amend and regional Comprehensive Plans, as appropriate, to incorporate the study results.	Municipalities, County, DVRPC
b. Collaborate to identify and prioritize the implementation plan and action items, as noted herein.	Municipalities, County, PennDOT, DVRPC
c. Identify key stakeholders (i.e., land owners, developers, etc.) in the project area that will be affected (positively or negatively) by the improvements, review the study findings with them, and establish a work plan to accomplish future improvements.	Municipalities
d. Promote the new roadway extensions, including their respective design, improvement plans and implementation processes at public meetings and stakeholder meeting.	Municipalities
e. Acquire the necessary right-of-way to construct the new roadways and intersection improvements, as needed.	Municipalities

- **Regulatory -** Malvern Borough and East Whiteland Township can modify new ordinances, revise existing ordinances, and set policies to help achieve implements of the new roadway extensions. It is noted that regulatory tasks associated with agency reviews and approvals are considered as part of the additional studies/engineering action items.

Initial Action Items	**Responsible Parties/Leaders**
a. Develop/modify and Official Map to show the new roadway extensions and alignments, as well as the required design guidelines, right-of-way, and multi-modal facilities.	Municipalities
b. Consider this project during municipal reviews (i.e., land development, subdivision, zoning, etc.) And highway occupancy reviews that other proposed Projects will not encumber the implementation of the New roadway extensions or associated improvements.	Municipalities, County, PennDOT

Initial Action Items	Responsible Parties/Leaders
c. Consider and adopt land use policies that promote sustainable growth and transportation, multi-modal travel (including transit use), and transit-oriented development design, and that are consistent with PennDOT's Smart Transportation guidelines.	Municipalities

- **Finance -** Again, due to the complexity, constraints, and the scope of needed improvements, implementation will be expensive. As such, funding support may be needed from multiple sources, including federal, state, local and private sources, as noted above.

Initial Action Items	Responsible Parties/Leaders
a. Seek and secure funding to implement the various phases of the project, as previously described and as mutually agreed upon by the municipalities.	Municipalities, Counties, PennDOT, DVRPC
b. Seek grant funding for transportation improvements and new ordinances or revisions, as available.	Municipalities, County
c. Consider establishing transportation impact fees to address new development/redevelopment impacts and possibly fund portions of the project and needed improvements.	Municipalities
d. Collaborate with developers and integrate portions of the project into future development/redevelopment plans.	Municipalities
e. Require dedication of right-of-way needed to accommodate roadway improvements during land development reviews.	Municipalities

To expedite the implementation of the project, both Malvern Borough and East Whiteland Township should consider securing funding from PennDOT, DCED and CDBG grants and local developer contributions. Local developer contributions would be applicable from any new land development application along the project study area. Both municipalities could negotiate contributions from the individual applicants. These contributions could be funds for engineering and construction or dedication of right-of-way for the proposed new roadway extensions and associated roadway improvements.

- **Future Studies/Engineering -** Additional and more detailed study and engineering of the project improvements, beyond the scope of this initial feasibility study, will be required as various phases of this project and implementation plan move forward. The type and scope of such studies will vary depending on the funding and implementation processes selected/secured, and which were previously summarized above in the discussions for the various implementation options.

In summary, both Malvern Borough and East Whiteland Township, if they seek to advance this project, should proceed with by continuing to work with the Chester County Planning Commission and contacting PennDOT District 6-0 to discuss the findings of this feasibility study and to establish

funding sources and a working plan for the project. Also, both municipalities should continue to work with any future land development applicants for securing construction funds and right-of-way, as appropriate.

7. CONCLUSIONS

As both Malvern Borough and East Whiteland Township seek to improve access to the industrial areas along Warren Avenue and to SEPTA's Malvern Train Station from Lancaster Avenue (U.S. Route 30) and points to the north in East Whiteland Township with a new roadway connection, this feasibility study evaluated the extension of Malin Road to Pennsylvania Avenue, as well as the extension of Three Tun Road to Malin Road to provide a new and improved access route to this area. Today, there is not an appropriate route to accommodate trucks travelling between this industrial area and major routes to the north such as U.S. Route 30, U.S. Route 222, and PA Route 29. As a result of the poor access to this area, truck traffic, as well as commuter traffic destined to/from the Malvern Train Station, must travel through neighborhoods and along narrow, residential roads that are not designed to intended to accommodate heavy vehicles or the level of traffic these streets carry today.
Based on the foregoing evaluation of the roadway extensions, this study concludes that while costly, the extension of Malin Road to both Pennsylvania Avenue and Tree Tun Road is feasible. Further, the study findings include:

- The potential roadway alignment alternatives are in a transitional area between the several land use context categories, and thus, the recommended classification for the roadway alignment alternatives is a Community Collector in a transitional Suburban Center context or hybrid Suburban Corridor/Center, in accordance with PennDOT's *Smart Transportation Guidebook*.

- This study evaluated two alignment alternatives for the Malin Road extension. The preferred alignment was selected since it has no right-of-way and physical (grading) impacts to the Amtrak right-of-way (SEPTA tracks) while the horizontal and vertical layout of this alignment was also designed to minimize impact to the existing General Warren Village residential properties to the north.

- The study evaluated one alignment alternative for the proposed extension of Three Tun Road. The preferred alignment alternative has no right-of-way and physical (grading) impacts to the Buckeye oil tank farm and facility and the Amtrak right-of-way (SEPTA tracks).

- No environmental issues have been preliminary identified at this time that would preclude the roadway and the identified roadway alignments, although further study and research is required during future stages of the project.

- Traffic volumes along roadways within the study area will generally decrease with the roadway extensions. However, potential traffic increases to Malin Road, between PA Route 401 and Lancaster Avenue, should be addressed due to the residential properties fronting portions of this roadway segment.

- The roadway extensions will better accommodate truck and buss traffic destined to/from the industrial areas near Warren Avenue and the Malvern Train Station, as well as divert this type of traffic from residential and village streets not designed to accommodate these larger vehicle types, by providing a more convenient route.

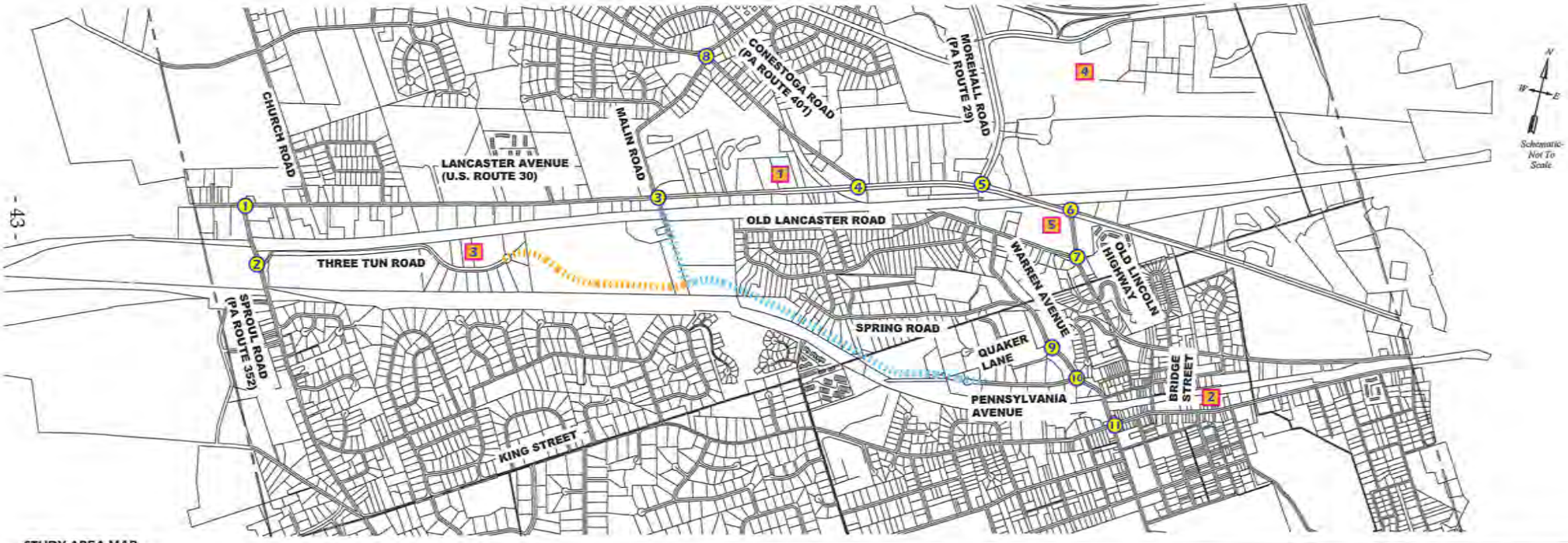
- Intersection improvements at those intersections that provide access to the roadway extensions (i.e., Lancaster Avenue/Malin Road, Pennsylvania Avenue/Warren Avenue, and PA Route 352/Three Tun Road) will be necessary but these improvements are relatively minor intersection improvements. However, it is noted that spacing along Malin Road between Lancaster Avenue and the Norfolk Southern rail line is limited for vehicular queuing and should be carefully considered when approving future land use plans or developments, as well as during the design of the Malin Road extension project.

- Traffic operations within the study will benefit from the potential new road linkages by removing traffic from already congested roadways. Significant reductions in overall intersection delay may be experienced throughout the study area. Some additional improvements such as turning lanes at intersections may be needed to better accommodate turning movements associated with diverted traffic patterns resulting from the new roadways.

- The roadway extensions will accommodate forecasted growth, and in particular, the transit-oriented development near the Malvern train station that the Borough envisions. Without the road extensions, significant improvements to the surrounding area roadways and intersections will be needed in order to achieve the traffic benefits (i.e., reductions in intersection delay) associated with the roadway extensions. If these improvements are not provided, then additional development traffic (and forecasted traffic growth) will further burden the already congested area roadway network.

- At this time, there are significant uncertainties regarding future funding for transportation infrastructure at all levels of government. As a result of these funding limitations, several major projects in the DVRPC region have been deferred, few new projects are being initiated, and there is considerable competition for any available resources. Accordingly, securing adequate funding for this project will be a challenge. For this project, it is important that the two municipalities as well as other stakeholders, property owners, and others work in a concerted effort to implement this project. A mutual “partnership” among the municipalities and stakeholders will be needed with the understanding that these improvements may need to occur gradually over time and potentially in stages.

- Due to the scope and costs of improvements associated with this project, it is anticipated that the overall project would occur in stages or phases. It may be most practical if the improvements along Pennsylvania Avenue and at the Pennsylvania Avenue/Warren Avenue were implemented first to support local development and the future roadway extension of Malin Road. This project would then be followed by the extension of Malin Road from its current southern terminus to Pennsylvania Avenue. The extension of Three Tun Road could likely be implemented at any time, independent of the Malin Road extension, although some modification to Malin Road and its intersection with Lancaster Avenue will be required if this extension were to occur first.



STUDY AREA MAP

1. THE RUBINO TRACT: 144,000 SQ. FT. OFFICE SPACE AND A 4,200 SQ. FT. BANK
2. EAST KING STREET REDEVELOPMENT: 200 APARTMENT UNITS, 20,000 SQ. FT. OF RETAIL, AND 20,00 SQ. FT. OFFICE SPACE
3. THREE TUN ROAD INDUSTRIAL SUBDIVISION: 35,00 SQ. FT. OF OFFICE SPACE, 112,000 SQ. FT. OF WAREHOUSE SPACE, AND ASSUMED 114,500 SQ. FT. INDUSTRIAL PARK BUILD OUT
4. UPTOWN WORTHINGTON: 300 APARTEMENT UNITS, 300 CONDOMINIUMS, 700,000 SQ. FT. OF OFFICE SPACE, AND 500,000 SQ. FT. OF RETAIL
5. OLD LINCOLN HIGHWAY OFFICE DEVELOPMENT: 86,400 SQ. FT. OF OFFICE SPACE

FIGURE 15

Proposed Major Developments

MALIN ROAD EXTENSION FEASIBILITY STUDY

MALVERN BOROUGH, CHESTER COUNTY, PA

LEGEND:

- # — DEVELOPMENT NUMBER
- # — STUDY INTERSECTION NUMBER

McMAHON TRANSPORTATION ENGINEERS & PLANNERS

(12-7-10) U:\engl\09534\Dwg\Figures\Local Developments.dwg

LANCASTER AVE. (S.R. 0030)

S. MALIN ROAD

MALIN ROAD EXTENSION

THREE TUNS ROAD EXTENSION

ALIGNMENT ALTERNATIVE NO. 2

RETAINING WALL

ROADWAY GRADE 5.00%

ROADWAY GRADE 10.01%

HP 465.30

1 N/F MERION APARTMENTS LP

3 N/F PENNSYLVANIA LINES LLC

4 CONSTITUTION DRIVE PARTNERS LP

5 N/F PENNSYLVANIA LINES LLC

6 N/F BUCKEYE TERMINALS LLC

7 CEMETERY

8 N/F BUCKEYE TERMINALS LLC

9 N/F 10 MALIN ROAD ASSOCIATES

10 N/F 10 MALIN ROAD ASSOCIATES

LEGEND

PROPOSED ROADWAY PAVEMENT

PROPOSED TRAIL PAVEMENT

McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

MALIN ROAD EXTENSION
FEASIBILITY STUDY

CONCEPTUAL ENGINEERING PLAN
FIGURE 13A

MALVERN BOROUGH/EAST WHITELAND TOWNSHIP, CHESTER COUNTY, PA

9/23/2010 SHEET 1 OF 5 1" = 50'

S. MALIN ROAD

LITTLE VALLEY CREEK

7
CEMETERY

9
N/F 10 MALIN
ROAD ASSOCIATES

4
CONSTITUTION DRIVE
PARTNERS-LP

10
N/F 10 MALIN
ROAD ASSOCIATES

12
CAROLE T. &
VINCENT T. BUETTNER

13
PETER C
KAREN M.

8
N/F BUCKEYE
TERMINALS LLC

11
N/F NATIONAL RAILROAD
PASSENGER CORP

ROADWAY GRADE
10.01%

ROADWAY GRADE
5.00%

RETAINING
WALL

PROPOSED
BOX CULVERT

STORMWATER
MANAGEMENT
FACILITY

3:1

HP
465.30

LP
452.94

MALIN ROAD EXTENSION

ALIGNMENT ALTERNATIVE NO. 2

THREE TUNS ROAD
EXTENSION

RAILROAD TRACK
LOCATION

LEGEND

PROPOSED ROADWAY PAVEMENT

PROPOSED TRAIL PAVEMENT

McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

MALIN ROAD EXTENSION
FEASIBILITY STUDY

CONCEPTUAL ENGINEERING PLAN
FIGURE 13B

MALVERN BOROUGH/EAST WHITELAND TOWNSHIP,
CHESTER COUNTY, PA

9/23/2010 SHEET 2 OF 5 1" = 50'

FAHNESTOCK ROAD

WOODVIEW ROAD

SPRING ROAD

MALIN ROAD EXTENSION

12
CAROLE T. &
VINCENT T. BUETTNER

13
PETER D. &
KAREN M. FIXLER

14
ANDREA C. SCHRAN

15
KATHLEEN M. &
LAWRENCE G. STAUFFER

65
BARRY & STACEY
HOLZHAUSER

66
LINDA A.
STANKIEWICZ

16
N/F ROBERT L
HOLSCLAW

17
N/F JOSHUA AND
RODINE ROACH

18
N/F RICHARD J AND
PATRICIA R McEVOY

19
N/F JAMES R AND
ELISSA W SEVERINO

20
N/F WILLIAM F AND
SUSAN DOYLE

21
N/F ANDREW AND
KERI PHILLIPS

22
N/F MICHAEL
JESSE CHONOLES

11
N/F NATIONAL RAILROAD
PASSENGER CORP

PROPOSED
BOX CULVERT

RETAINING
WALL

RETAINING
WALL

ROADWAY GRADE
13.00%

ROADWAY GRADE
2.60%

2:1

HP
547.55

ALIGNMENT ALTERNATIVE NO. 2

RAILROAD TRACK
LOCATION

LITTLE VALLEY CREEK

LEGEND

PROPOSED ROADWAY PAVEMENT

PROPOSED TRAIL PAVEMENT

McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

MALIN ROAD EXTENSION
FEASIBILITY STUDY

CONCEPTUAL ENGINEERING PLAN
FIGURE 13C

MALVERN BOROUGH/EAST WHITELAND TOWNSHIP,
CHESTER COUNTY, PA

9/23/2010 SHEET 3 OF 5 1" = 50'

21
N/F ANDREW AND KERI PHILLIPS

22
N/F MICHAEL JESSE CHONOLES

23
N/F JEFFERY R GRECO AND LUCIE J KNIPE

24
N/F BRUCE M AND DENISE M PANCOAST

26
N/F JERI L ESTOK

27
N/F ROBERT L HOLSCLAW

67
HAI T. BANH & ELIZABETH E. SIA

58
N/F HK DOUBLE-M LESTER L MOORE, PA GEORGE H McLAUGHLIN

28
N/F ATWIN INVESTMENTS LP

32
N/F CALDWELL GREER INVESTMENTS LP

UNNAMED TRIBUTARY TO LITTLE VALLEY CREEK

STORMWATER MANAGEMENT FACILITY

STORMWATER MANAGEMENT FACILITY

RETAINING WALL

PROPOSED BOX CULVERT

ROADWAY GRADE 2.60%

11
N/F NATIONAL RAILROAD PASSENGER CORP

RETAINING WALL

ROADWAY GRADE 2.60%

RAILROAD TRACK LOCATION

25
N/F NATIONAL RAILROAD PASSENGER CORP

MALIN ROAD EXTENSION

LP
506.57

28
N/F ATWIN INVESTMENTS LP

ROADWAY GRADE 8.00%

RETAINING WALL

29
N/F PHILA ELECTRIC CO

31
N/F NATIONAL RAILROAD PASSENGER CORP

LEGEND

PROPOSED ROADWAY PAVEMENT

PROPOSED TRAIL PAVEMENT

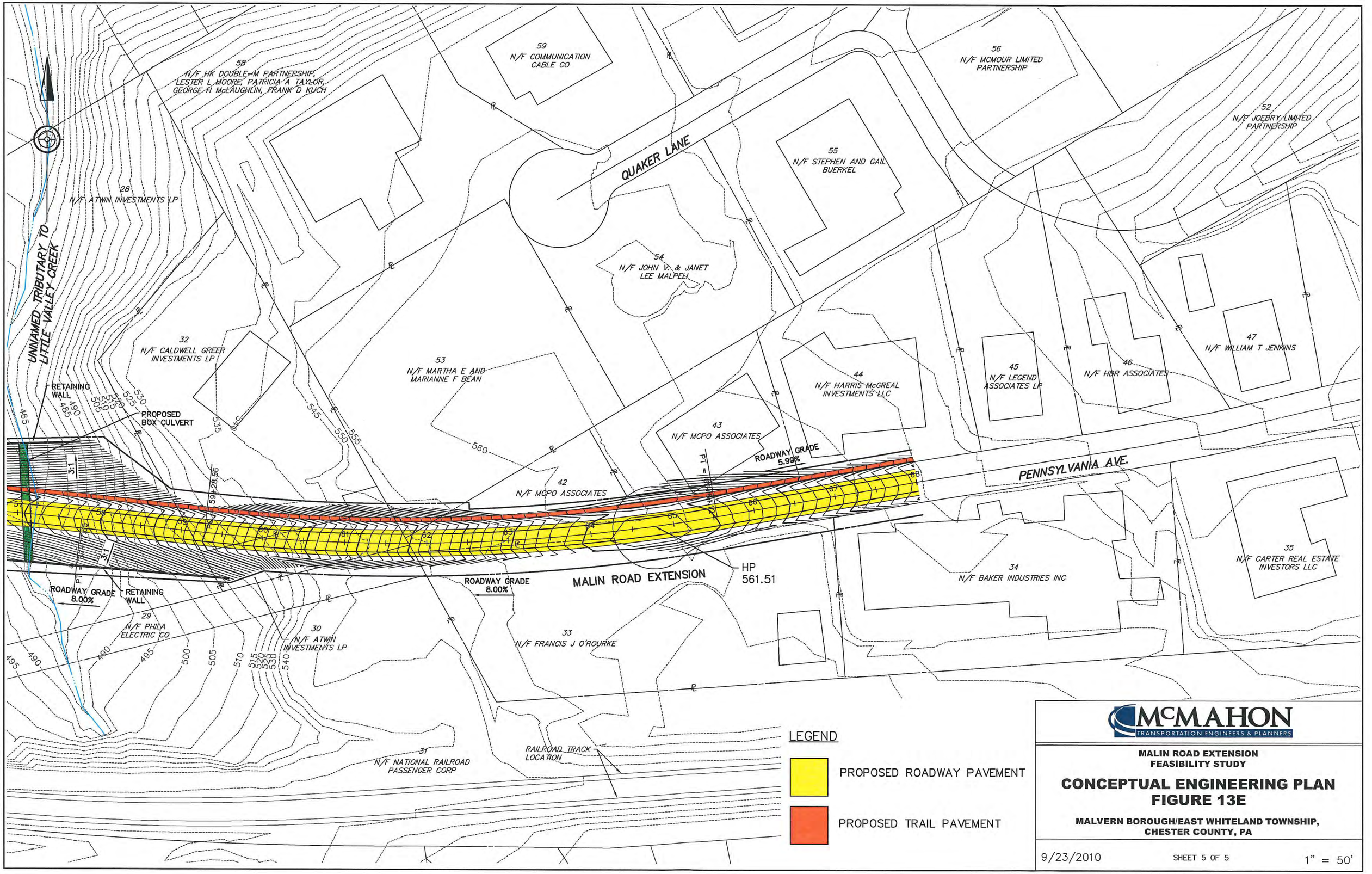
McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

MALIN ROAD EXTENSION
FEASIBILITY STUDY

CONCEPTUAL ENGINEERING PLAN
FIGURE 13D

MALVERN BOROUGH/EAST WHITELAND TOWNSHIP, CHESTER COUNTY, PA

9/23/2010 | SHEET 4 OF 5 | 1" = 50'



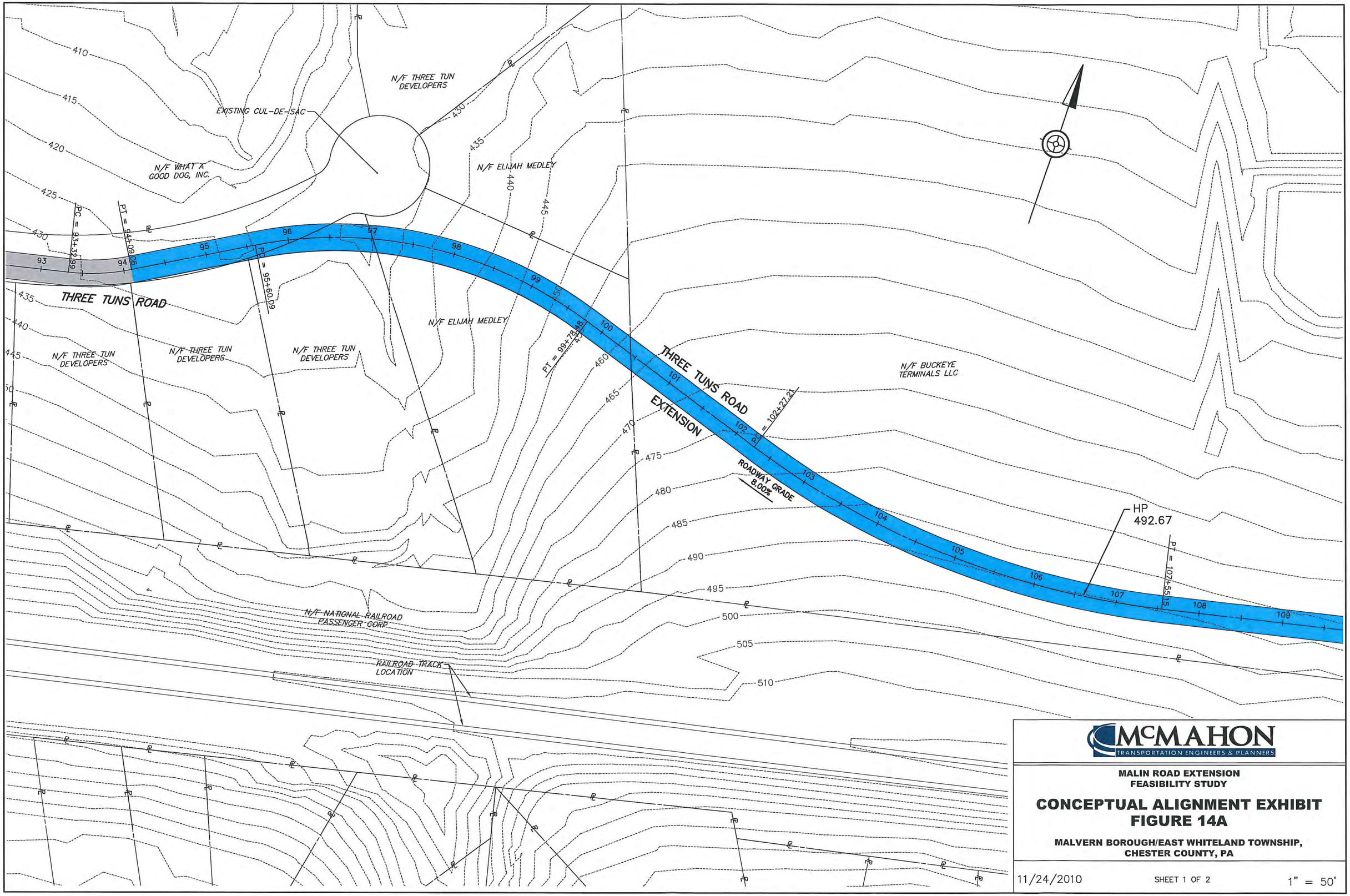
McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

MALIN ROAD EXTENSION
FEASIBILITY STUDY

CONCEPTUAL ENGINEERING PLAN
FIGURE 13E

MALVERN BOROUGH/EAST WHITELAND TOWNSHIP, CHESTER COUNTY, PA

9/23/2010 SHEET 5 OF 5 1" = 50'



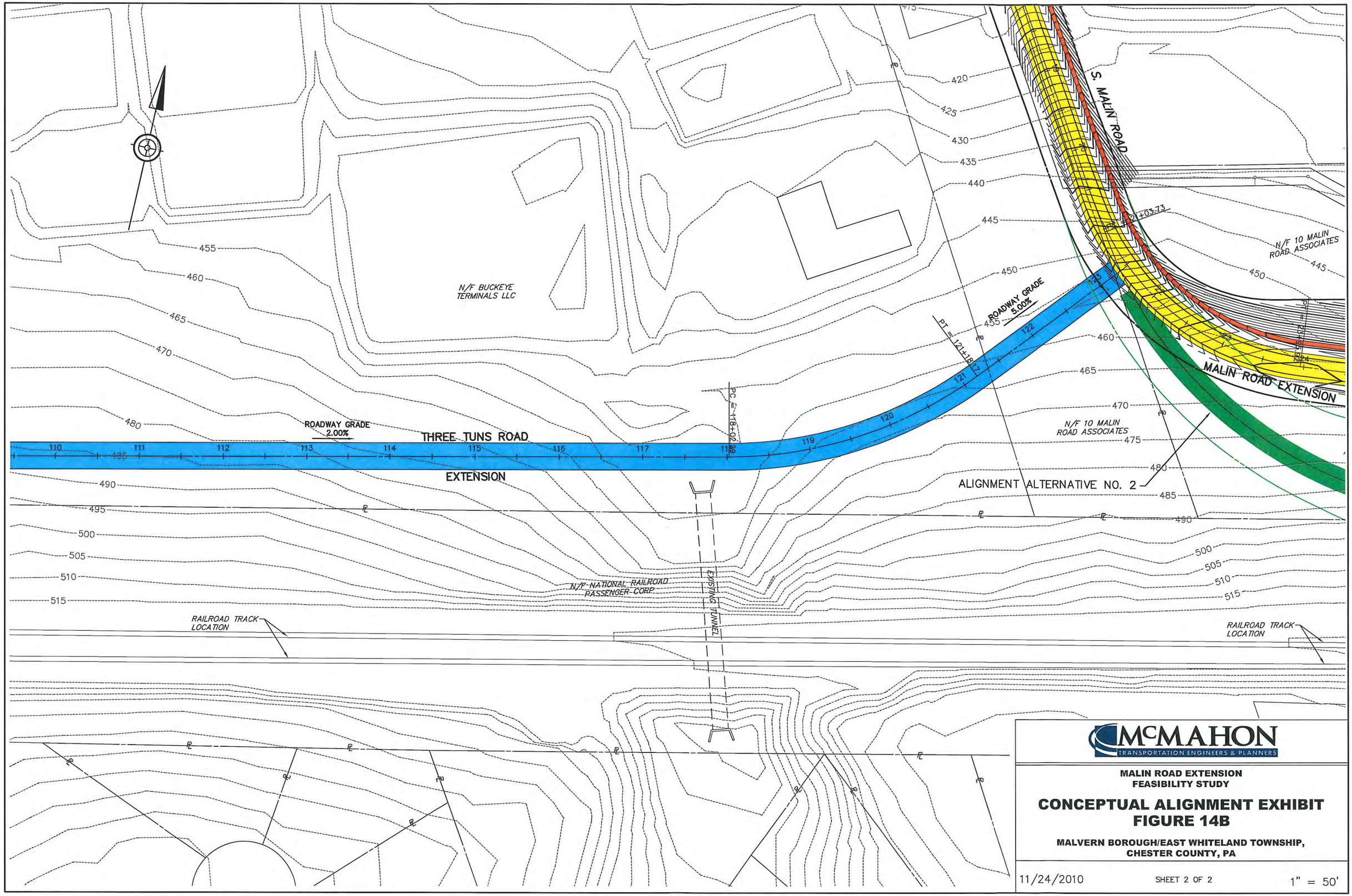
McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

MALIN ROAD EXTENSION
FEASIBILITY STUDY

CONCEPTUAL ALIGNMENT EXHIBIT
FIGURE 14A

MALVERN BOROUGH/EAST WHITELAND TOWNSHIP, CHESTER COUNTY, PA

11/24/2010 | SHEET 1 OF 2 | 1" = 50'



McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

MALIN ROAD EXTENSION
FEASIBILITY STUDY

CONCEPTUAL ALIGNMENT EXHIBIT
FIGURE 14B

MALVERN BOROUGH/EAST WHITELAND TOWNSHIP, CHESTER COUNTY, PA

11/24/2010 SHEET 2 OF 2 1" = 50'