President George Bush Turnpike

Eastern Extension Engineering Report

August 2008

Prepared by

HNTB

NTTA
NORTH TEXAS TOLLWAY AUTHORITY

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HNTB

Dr. Jorge Figueredo
Executive Director
North Texas Tollway Authority
P.O. Box 260729
Plano, Texas 75026

August 20, 2008

Dear Dr. Figueredo:

As required per the North Texas Tollway Authority's Trust Agreement, the General Engineering Consultant has prepared and is pleased to present the attached report describing the engineering features of the President George Bush Turnpike Eastern Extension Project as proposed for construction by the Authority. The report includes an estimate of the Project construction costs and a layout plan of the proposed construction upon which the estimated cost is based.

The conclusions of the engineering, planning and studies indicate that the Project can be constructed at an estimated cost of $1,039,751,554 exclusive of interest and financing costs. It is also estimated that construction of the Project can be completed in approximately 40 months and can be opened to traffic in late 2011.

We wish to acknowledge the cooperation, advice and assistance of the staff, legal counsel, traffic engineers, the financial advisors of the North Texas Tollway Authority, the Texas Department of Transportation and in particular Dallas County and the cities of Garland, Rowlett, Sachse and Dallas for their dedicated efforts in the development of the Project.

Respectfully Submitted,

Stephanie Halliday

Stephanie Halliday, P.E.
General Engineering Consultant Project Director

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Executive Summary

Introduction

The North Texas Tollway Authority (NTTA) is a regional tollway authority and a political subdivision of the state of Texas created in accordance with Chapter 366 of the Texas Transportation Code. The NTTA is authorized to acquire, design, construct, maintain, repair and operate turnpike projects; to raise capital for construction projects through issuance of turnpike revenue obligations; and to collect tolls to operate, maintain and pay debt services on those projects in Collin, Dallas, Denton and Tarrant counties in Texas. Each of these four counties appoints two representatives to the Board of Directors, and the governor of Texas appoints one member from a county adjacent to the NTTA's four-county service area. The NTTA is dedicated to fulfilling its mission, which is to provide a fiscally sound system of innovative toll facilities, services and solutions that improves the mobility, quality of life and economy of the North Texas region.

This report describes the location, engineering design features, construction cost estimates and estimates of operation and maintenance costs of the proposed President George Bush Turnpike (PGBT) Eastern Extension Toll Project (the "Project") in Dallas County from State Highway (SH) 78 to Interstate Highway (IH) 30, a distance of approximately 9.9 miles. In addition, this report includes the engineering design standards, typical sections and project plan and profile for the Project.

Project Description

The PGBT Eastern Extension Toll Project extends the existing 30-mile, in-service turnpike approximately 9.9 additional miles to the south and east. The Project extends from the current terminus at SH 78 through the cities of Garland, Sachse, Rowlett and Dallas to IH 30 in Dallas County. The Project, which creates a direct link from the existing terminus of PGBT to IH 30, serves as a primary relief route to IH 635 in a corridor that continues to experience significant growth in commercial, retail and residential development. The Project is divided into five sections for purposes of managing and expediting the design and construction. The purpose of the Project described in this report is to meet the growing traffic demands in northeast Dallas County.

Section 28, the most northwesterly portion of the Project, extends east for more than two miles from SH 78 to just west of Miles Road. The NTTA is responsible for constructing main lane and ramp pavement, bridge and drainage structures, retaining and sound walls, illumination, signing, pavement markings, traffic signals, landscaping, intelligent transportation system (ITS) infrastructure and six ramp toll gantries for all-electronic tolling collection (ETC). This section of the project is scheduled to open to traffic along with the remainder of the corridor by late 2011.

Section 29 extends east and southeast for more than two miles from just west of Miles Road to north of the future Merritt Road (the future Merritt/Liberty Grove Connector). The NTTA is responsible for constructing main lane, ramp, and frontage road pavement; bridge and drainage structures; retaining walls; illumination; signing; pavement markings; traffic signals; landscaping; ITS infrastructure; and one main lane gantry for ETC. This section of the project is scheduled to open to traffic along with the remainder of the corridor by late 2011.

Section 30, the most complex section of the NTTA Project sections, extends south for nearly three miles from north of the future Merritt Road to south of Main Street, and includes an underpass of a future Dallas Area Rapid Transit (DART) rail line. The NTTA is responsible for constructing main lane, ramp, and frontage road pavement; bridge and drainage structures; retaining and sound walls; illumination; signing; pavement markings; traffic signals; landscaping; ITS infrastructure; and two ramp toll gantries for ETC. This section of the project is scheduled to open to traffic along with the remainder of the corridor by late 2011.

Section 31, the southernmost portion of the NTTA Project sections, extends south for nearly two miles from south of Main Street to the north bank of Lake Ray Hubbard. The NTTA is responsible for constructing main lane, ramp, and frontage road pavement; bridge and drainage structures; retaining and sound walls; illumination; signing; pavement markings; traffic signals; landscaping; ITS infrastructure; and four ramp toll gantries for ETC. This section of the project is scheduled to open to traffic along with the remainder of the corridor by late 2011.

Section 32, the southernmost section of the overall Project, extends south for more than one mile from the north bank of Lake Ray Hubbard to IH 30. The Texas Department of Transportation (TxDOT) is responsible for constructing the bridge over Lake Ray Hubbard and a multi-level interchange with direct connecting ramps to IH 30, main lane and ramp pavement, bridge and drainage structures, retaining walls, illumination, signing, pavement markings, traffic signals, landscaping and ITS infrastructure. This section of the project is scheduled to open to traffic along with the remainder of the corridor by late 2011. TxDOT has committed, through the Two-Party Agreement (2PA) between NTTA and TxDOT, to complete the construction of this section by no later than January 1, 2012.

A total of 12 ramp connections to the Project will have an overhead gantry to allow for placement of ETC equipment that has the ability to read transponders issued by NTTA (TollTag) and TxDOT (TxTag) and the ability to read license plates of vehicles without transponders. One main lane gantry is located near the middle of the Project (Section 29) and will provide for six toll collection lanes (three each direction with provision for future widening) equipped with TollTag (NTTA), TxTag (TxDOT) and license plate collection capability. All toll collection lanes are dedicated, non-stop express lanes to expedite the flow of traffic through the gantries and provide for ease of maintenance.

Project Costs

The current estimated total Project cost (Sections 28-32) is $1,039,751,554 (adjusted for inflation) to be shared with the NTTA, TxDOT, and the cities of Garland, Sachse, and Rowlett. This estimated cost includes design, construction, utility relocation, and right-of-way (ROW) acquisition. Per the 2PA, TxDOT is providing the design, construction, and construction management of Section 32 (approximately $254 million) as well as a Toll Equity Grant in the amount of $160 million to be used for right-of-way acquisition, utility relocations, or any other items for the Project agreed to mutually between NTTA and TxDOT. In addition, the NTTA has executed interlocal agreements with the Cities of Garland, Rowlett, and Sachse; the combined contributions from these cities are approximately $16 million. Therefore, the NTTA is responsible for approximately $610 million of the total Project cost.

Design of the Project is essentially complete. The competitive bid opening for Section 30 was in April 2008. The remaining Project sections are scheduled for competitive bid openings in August (Section 28 and Section 32), September (Section 29) and November (Section 31) of 2008. Quantities of the major construction items were developed from construction plans and include pavement, grading, drainage, bridges, retaining and sound walls, gantries, ETC and ITS equipment and other related elements of construction. The estimated quantities and the unit prices for similar NTTA and TxDOT construction in the Dallas area were used to estimate the total construction cost. The unit prices are based on costs expected to be received through the competitive bidding process in 2008.

Factors including unforeseen escalation of prices and wages, labor or material shortages and changes in economic conditions can significantly affect (escalate or reduce) construction costs. Appropriate contingencies are added to the Project cost to cover the unforeseen escalations. The estimated Project cost reflects our professional judgment of the construction industry, and it is our belief that the Project can be constructed within the limits described for the estimated cost given herein. However, due to the nature of the construction industry, we cannot and will not guarantee that the actual Project cost will not vary from the estimated cost.

Environmental Considerations

An Environmental Impact Statement (EIS) was developed for the Federal Highway Administration (FHWA), TxDOT and the NTTA to determine the Project's social, economic and environmental effects as required by the National Environmental Policy Act (NEPA) of 1969. This environmental document was cleared and a Record of Decision (ROD) was issued by the FHWA in January 2005. However, design modifications (per executed interlocal agreements with participating cities) including new overpass structures, a new frontage road segment, implementation of all-ETC facilities, additional turn lanes, bridge widening and modifications to the IH 30 interchange required an environmental re-evaluation. The revised re-evaluation document was approved by FHWA and TxDOT Environmental Affairs Division in July 2008.

Under Section 404 of the Clean Waters Act, the U.S. Army Corps of Engineers (USACE) regulates the discharge of dredged or fill material into waters of the United States, including wetlands. Therefore, authorization by the USACE in the form of a nationwide permit is required for the Project for the discharge of dredged or fill materials and for construction of box culverts and/or bridges in waters of the United States that exist on the Project site. An Individual Section 404 Permit application was submitted and approved in April 2008.

Other environmental considerations for the project are an archaeological site located in Section 28 and a historic home (Coyle House) within the existing ROW in Section 30 of the project. Based on conditions of the environmental re-evaluation approval, work may not begin in a limited area of this section until required archaeological surveys have been completed, which are scheduled for completion by August 2009. The future site of the Coyle House has been determined, preliminary site development is underway, and the house is scheduled for relocation by March 2009.

Schedule

Project design began in August 2005 and is essentially complete. Section 30 was the first portion of the Project scheduled for competitive bidding (April 2008) because it has the longest construction duration (approximately 40 months) of all Project sections. Other Project sections are scheduled for competitive bidding through November 2008. Since the environmental re-evaluation has been approved, the USACE permit has been obtained, and interlocal agreements with TxDOT, DART, and the Cities of Garland, Rowlett, Sachse, and Dallas have been executed, construction is scheduled to begin in August 2008. The Project construction is scheduled to be completed and the corridor opened to traffic by late 2011. Refer to Table 2, page 10, for milestone schedule dates.

Introduction

The Project, located entirely in Dallas County, begins at the current terminus of the President George Bush Turnpike (PGBT) at State Highway (SH) 78 in the city of Garland and extends east through the city of Sachse, then south through the cities of Rowlett and Dallas and terminates at Interstate Highway (IH) 30 in Garland, which is located just east of Dallas. The PGBT is currently in service (approximately 30 miles) from west of Belt Line Road in Irving to SH 78 in Garland, the majority of which is parallel to Interstate Highway 635 (LBJ Freeway) in the far north Dallas area. The purpose of the Project described in this report is to extend the existing PGBT and create a direct link from SH 78 to IH 30 to meet the growing traffic demand in northeast Dallas County. That area has experienced rapid growth from residential, retail and commercial development, and the PGBT will serve as a primary relief route to the LBJ Freeway. The Project is divided into five sections for purposes of managing and expediting the design and construction (refer to the Project map on page 2). Four sections will be designed and constructed by the North Texas Tollway Authority (NTTA). The fifth will be designed and constructed by the Texas Department of Transportation (TxDOT). In late 2005, the NTTA completed construction of the frontage roads from SH 78 to Firewheel Parkway in Garland and opened them to traffic in advance of the opening of Firewheel Mall, located adjacent to the beginning of the Project.

Description of Project

PGBT Corridor

The PGBT (originally designated as SH 190) was conceived to relieve traffic congestion along the LBJ freeway in the far north Dallas area. The PGBT corridor was also planned to serve the anticipated population growth in the northeastern section of the Metroplex by providing an alternative route for travel around the city of Dallas and through its northern suburbs. Segments 1–5 of the PGBT, west of Belt Line Road in Irving (west of Dallas) to SH 78 in Garland (northeast of Dallas), are currently open to traffic and provide access to and from the highly developed commercial, retail and residential areas of the far north Dallas area and the cities of Irving, Farmers Branch, Carrollton, Plano, Richardson and Garland.

To expedite and facilitate convenient design and construction, the Project was divided into five sections. The typical main lane section for the entire Project will match the existing PGBT typical section, which utilizes three main lanes in each direction separated by a 48-foot-wide median and a continuous concrete traffic barrier for improved safety and traffic flow (see Appendix pages 16-17). The six-lane facility has remaining space in the median for additional capacity improvements and accommodates expansion to an ultimate eight-lane condition, with the additional lane in each direction to be added as traffic volumes warrant. Parallel two- or three-lane frontage roads in each direction will be included in various sections of the Project to provide access to local areas.

Section 28

Section 28 begins at SH 78 in Garland, the current terminus of the PGBT, and extends east to just west of Miles Road in Sachse. It includes three main lanes in each direction for more than two miles. Construction of this section consists of main lane and ramp pavement, bridge and drainage structures (including a one-mile bridge over Rowlett Creek), retaining and sound walls, illumination, signing, pavement markings, traffic signals, landscaping and intelligent transportation systems (ITS) infrastructure. Gantries for all-electronic tolling collection (ETC) will be provided at six ramp locations to allow access to and from the frontage roads at Crist Road, Firewheel Parkway and Miles Road. Ramps will also be provided to and from SH 78. In late 2005, the NTTA completed construction of the frontage roads from SH 78 to Firewheel Parkway and opened them to traffic before the opening of Firewheel Mall on the north side of the Project. The remaining construction for this section of the Project is scheduled to open to traffic along with the remainder of the corridor by late 2011. The Section 28 plan and profile are shown on Plates 1 through 5 in the Appendix.

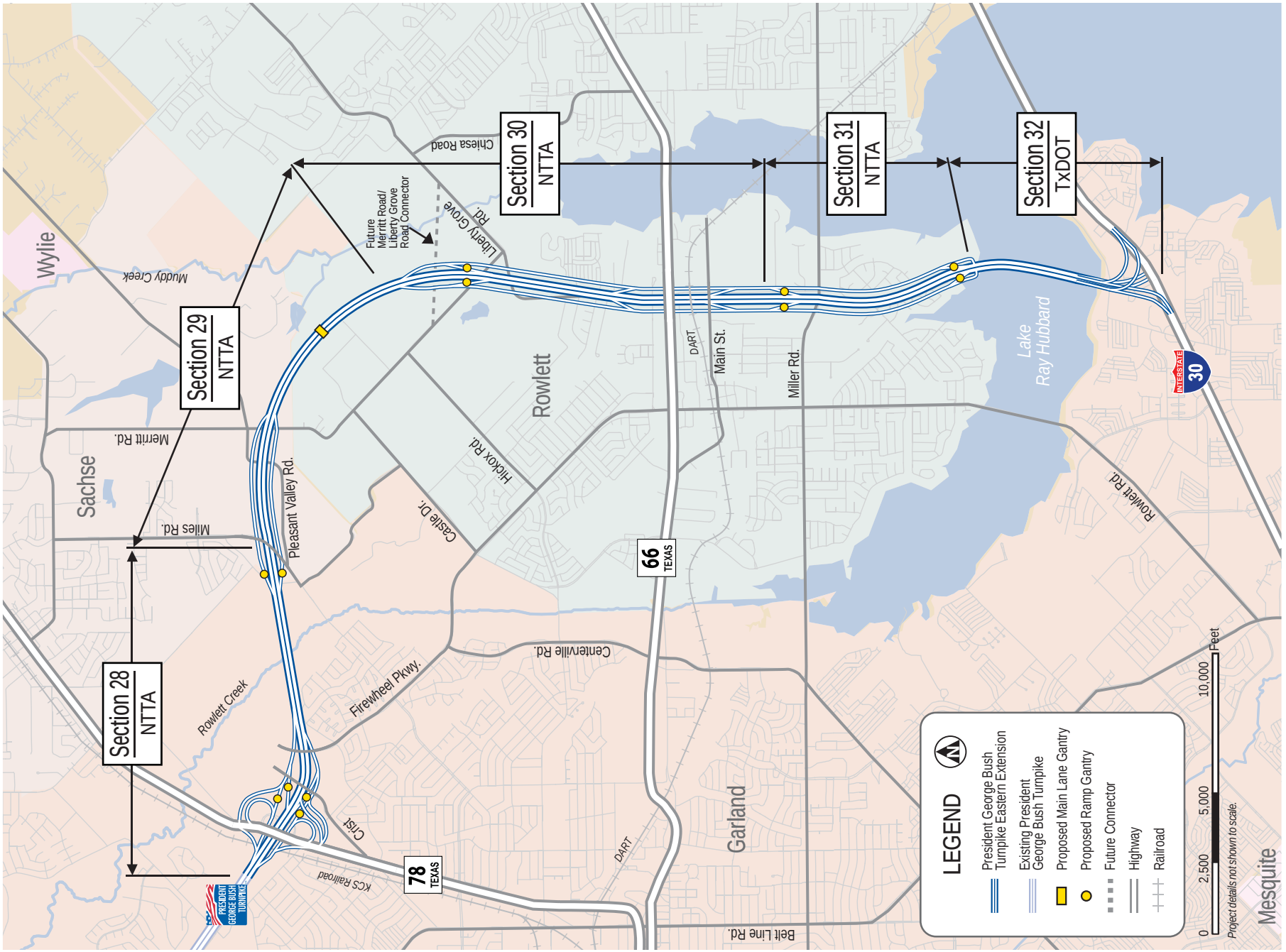


Figure 1 – President George Bush Turnpike Eastern Extension Corridor Location and Sections

Section 29

Section 29 begins just west of Miles Road in Sachse and extends east and southeast for more than two miles to north of the future Merritt Road in Rowlett. Construction of this section includes pavement for three main lanes in each direction, two-lane frontage roads between Miles and Merritt Roads, ramps to and from Merritt Road, bridge and drainage structures, retaining walls, illumination, signing, pavement markings, traffic signals, landscaping and ITS infrastructure. A main lane toll gantry will be located near the east end of the section for all-ETC toll collection of all main lanes. This section of the Project is scheduled to open to traffic along with the remainder of the corridor by late 2011. The Section 29 plan and profile are shown on Plates 5 through 8 in the Appendix.

Section 30

Section 30, the most complex of the NTTA Project sections, extends south for nearly three miles from north of the future Merritt Road to south of Main Street in Rowlett and includes three main lanes in each direction. Construction of this section consists of main lane, frontage-road and ramp pavement; bridge and drainage structures; retaining and sound walls; illumination; signing; pavement markings; traffic signals; landscaping; and ITS infrastructure. Gantries for all-ETC toll collection will be provided at two ramp locations to allow access to and from the frontage roads, which begin at the future Merritt Road and extend south for the entire Project through the Liberty Grove, SH 66 (Lakeview Parkway), and Main Street intersections. The majority of this section is depressed below the existing grade and has conflicts with various major utilities. This section is constrained on both sides from recent commercial development and includes an underpass with an existing railroad which is anticipated to be a future Dallas Area Rapid Transit (DART) rail line. This section of the Project is scheduled to open to traffic along with the remainder of the corridor by late 2011. The Section 30 plan and profile are shown on Plates 8 through 12 in the Appendix.

Section 31

Section 31, the southernmost NTTA section of the Project, extends south for almost two miles from south of Main Street to the north bank of Lake Ray Hubbard in Rowlett and includes three main lanes in each direction. Construction of this section consists of main lane, frontage-road and ramp pavement; bridge and drainage structures; retaining and sound walls; illumination; signing; pavement markings; traffic signals; landscaping; and ITS infrastructure. Gantries for all-ETC toll collection will be provided at four ramp locations to allow access to and from the frontage roads at SH 66, Main Street, and Miller Road. This section of the project is scheduled to open to traffic along with the remainder of the corridor by late 2011. The Section 31 plan and profile are shown on Plates 12 through 14 in the Appendix.

Section 32

Section 32, the southernmost section of the Project, extends south for more than one mile from the north bank of Lake Ray Hubbard in Rowlett and terminates at IH 30 in Garland. This section of the Project was designed and will be constructed and construction management will be performed by TxDOT. This section includes a one-mile bridge over Lake Ray Hubbard and a multi-level interchange with direct connecting ramps to and from IH 30, a TxDOT facility. The direct connecting ramps will provide direct access from southbound PGBT to eastbound and westbound IH 30 and from eastbound and westbound IH 30 to northbound PGBT. Construction of this section includes main lane (PGBT and IH 30), frontage-road (IH 30) and ramp pavement; bridge and drainage structures (including a drainage containment system on the lake bridge per the interlocal agreement with the City of Dallas); retaining walls; illumination; signing; pavement markings; landscaping; and ITS infrastructure. This section of the project is scheduled to open to traffic along with the remainder of the corridor by late 2011. Per the NTTA-TxDOT Two-Party Agreement (2PA), TxDOT has committed to complete the construction of this section by January 1, 2012 at the latest. The Section 32 plan and profile are shown on Plates 14 through 19 in the Appendix.

Future Improvements

The NTTA will construct additional lanes in the future as traffic volumes warrant. The proposed six-lane typical section for the initial construction will include 12-foot inside shoulders and adequate space in the median to accommodate an eight-lane facility. This expansion, which will not require any additional right of way (ROW), will be accomplished by constructing additional 10-foot wide shoulders (one each direction) in this inside median. All main lane and overpass structures will be initially constructed to accommodate the ultimate eight-lane condition, but will be striped off until a future date when the roadway shoulders are constructed.

Engineering Geology

A geotechnical investigation was completed along with the design of the Project. Subsurface borings were made at locations along the roadway alignment to determine how the geological conditions might affect the design and construction of the roadway, bridges and retaining walls. Laboratory tests were performed on collected soil samples to determine their composition, characteristics and engineering properties.

The Project alignment extends across two geologic formations. The Austin Chalk Formation is the uppermost formation west of Rowlett Creek (most of Section 28), while the Ozan "Lower Taylor Marl" Formation is the uppermost formation east of Rowlett Creek (eastern sliver of Section 28 and Sections 29 – 32). Soils along Section 28 predominantly consist of sandy and silty low plasticity clay deposits. Soils along the far east end of Section 28 and Sections 29–32 predominantly consist of high-plasticity residual clay. Groundwater was encountered above and near proposed grade in some borings.

The geotechnical investigation determined that subsurface conditions are relatively compatible with proposed Project features. Adverse conditions requiring mitigation to improve stability and reduce settlement of certain embankments and retaining walls were only encountered at a few locations. The shale of the Taylor Marl and the limestone of the Austin Chalk are suitable for support of the drilled shaft foundations to be used at all bridge structures. The most significant geologic concern is the highly expansive nature of the high plasticity clay soils encountered along the alignment. Wherever it is used as pavement subgrade, the shrink-swell behavior of high plasticity clay must be controlled and is addressed in more detail in the pavement section on page 5.

Design Standards

The design proposed for the Project incorporates and conforms to geometric design criteria that are consistent with the current standards and practices of the American Association of State Highway and Transportation Officials (AASHTO) and TxDOT. The Project is also designed to comply with the technical requirements of the Federal Highway Administration (FHWA) and NTTA design guidelines.

Roadway

The Project has been designed for safe operation at speeds consistent with the existing operating PGBT. Designs were based on a desirable speed of 70 miles per hour (mph) for main lanes (minimum 60 mph), 35 mph minimum to 50 mph (desirable) for ramps, and 45 mph for frontage roads. Desirable values for designs were used when possible to maximize safety. These design speeds provide safety in terms of vertical alignment and stopping sight distance without significantly increasing project costs. All interchange ramps are designed to provide a smooth and safe transition between the PGBT main lanes and frontage roads and intersecting streets.

The initial construction of the Project will consist of six traffic lanes, three in each direction, with provision for widening to eight lanes in the future as traffic volumes warrant. PGBT main lanes will be 12 feet wide throughout the Project; the right (outside) shoulder will be 10 feet wide and the left (inside) shoulder will be 12 feet wide to allow a disabled vehicle to stop without interfering with the through traffic lanes. Both shoulders will be constructed of concrete and will match the adjoining pavement section. In sections with the paving grade below natural ground, a concrete shoulder with traffic-rail protection along retaining walls will be employed. A 48-foot-wide planted median with a concrete median barrier between opposing directions

of traffic will be provided over the entire Project to prevent vehicles from crossing through the median. If additional lane capacity is required in the future, the median will accommodate one additional standard 12-foot lane and 10-foot shoulder in each direction while maintaining an adequate center median for safety.

Frontage roads are provided for local traffic circulation along much of the project. In general, these one-way frontage roads have two or three 12-foot lanes in each direction parallel to the main lane alignment. Many of the cross streets will have Texas U-turns to enhance traffic circulation. As stated previously, concrete traffic rails or guard fence will be provided along the outside shoulders, where necessary, for added safety.

Typical ramps are 14 feet in width with an eight-foot outside shoulder and a two-foot inside shoulder. In restricted areas, it may be necessary to reduce the width of the ramp pavement. However in all ramp locations, adequate shoulder and ramp pavement width will be provided to allow traffic to pass a stalled vehicle.

The pavement lanes will be clearly marked. In addition, to aid in the safety of traffic operations, overhead safety lighting (not continuous), warning signs and dynamic message signs (DMS) will be provided to inform motorists of upcoming roadway conditions.

Typical sections for the PGBT lanes are shown on pages 16-17 of the Appendix. The frontage roads are also shown, indicating their relative position to the PGBT main lanes.

Pavement

Two separate pavement design methodologies were used for the Project, the application of which depends on the party responsible for the long-term maintenance. The main lanes and ramps will be maintained by the NTTA, while TxDOT will be responsible for maintaining the frontage roads. The pavement for main lanes and ramps consists of 13 inches of continuously reinforced portland cement concrete (CRCP) supported by 1-1/2 inch thick asphalt bond breaker, 6 inches of cement stabilized base and 12 inches of either lime stabilized subgrade or cement stabilized subgrade (CSS). Below these layers will be one to nine feet of moisture treated subgrade as needed to control the shrink-swell behavior of subgrade materials. The shoulders will be constructed with the same thickness and materials as the main lanes. The frontage road pavement section consists of 11 inches of CRCP over four inches of asphaltic concrete pavement and 12 inches of CSS. Nine to 27 inches of subgrade below this frontage road pavement section will be a material with limited expansion potential. Both pavement sections were designed to handle the potential for increases in truck traffic along the Project.

Structures

All main lane overpass and underpass structures have been designed for HL-93 loading in accordance with the latest edition of AASHTO's *2004 LRFD Bridge Design Specifications*. The DART railroad underpass bridge has been designed for the appropriate railroad loading in accordance with the requirements of the railroad company. Bridges will be steel-reinforced concrete construction for standard spans and steel plate or tub girders for long and highly curved spans. Retaining walls will be steel-reinforced concrete and reinforced-earth construction. Drilled-shaft or soil-nail retaining walls will be used where required by geometric and/or staging restrictions (such as when excavating next to an open roadway) and where soil bearing capacity limitations prohibit the use of mechanically stabilized earth (MSE) walls. In general, MSE walls will be used wherever drilled-shaft or soil-nail walls are not required.

The PGBT main lane structures will be constructed for the ultimate eight-lane condition, with each directional roadway on a separate structure, and will provide three 12-foot traffic lanes in each direction. The outside and inside shoulders will be 10 feet and 22 feet in width, respectively, plus one foot for a traffic rail on each side, which creates a typical total bridge width of 70 feet in each direction. Cross-street bridges consist of a varying number of 12-foot traffic lanes and sidewalks, with no shoulders provided. Ramp and direct connector bridges are 24 to 26 feet in width, with 2 to 4 foot (inside) and 8 foot (outside) shoulders and a 14 foot travel lane.

Drainage

As with any limited access facility of this nature, it is important to provide a drainage system that will remove storm water from the pavement in a rapid and efficient manner. The collection and disposal of all surface water will be accomplished by a system of ditches, inlets and pipes along the PGBT and the use of existing natural swales and artificial conduits.

For this Project, significant drainage areas, sizes of culverts and number and location of inlets were determined and major drainage structures were identified. All drainage for the Project will be by gravity. The cost of constructing, relocating, and modifying the drainage system for the Project is included in the Project Cost Estimates section of this report.

All drainage designs conform to standard TxDOT and NTTA specifications with such modifications as required to comply with local municipality practices and methods. All drainage for the existing PGBT sections was designed using the same design criteria and is in place and fully operational.

System-Wide Design Guidelines

The NTTA has proposed to use its system-wide design guidelines and standards for all sections of the Project, with the exception of specific items in Section 30 (at SH 66) and 32 (along IH 30) that will be maintained by TxDOT. All sections include structural signing, bridges, retaining walls, ROW fencing, lighting, toll gantry and landscape elements to promote visual consistency on all NTTA facilities. These aesthetic elements are provided to enhance the NTTA customers' driving experience and maximize safety for the motorists. The proposed guidelines will match the design guidelines used on the existing frontage roads from SH 78 to Firewheel Parkway. Textured or natural gray concrete will be used for nearly all concrete finishes; paint will only be used for accent color.

Landscape

The NTTA will plant landscaping in key areas of the Project that serve as important focus areas with the surrounding communities. These focus areas typically fall into one of five categories: Interchanges, main lane gantries, underpasses, overpasses and roadway medians. These focus areas will be carefully examined within the context of the whole system and prioritized for improvements. Plant materials will be carefully selected for specific characteristics such as low water requirement, native or adapted qualities and seasonal interest.

Illumination

Safety illumination on an urban, controlled-access facility is essential to improve nighttime visibility and maximize safety. The design of the illumination system conforms to TxDOT's *Traffic Operations Manual, Highway Illumination,* April 1995. Illumination of toll gantries and the main lane entry and exit points will provide safety and improve visibility, operations and security.

Signing

Signing is used extensively on high-volume roadways to inform, warn and control drivers. Therefore, it must be an integral part of the design process. Guide signs, which provide motorists information on routes and destinations along with regulatory and warning signs are included on the Project and conform to the *Manual of Uniform Traffic Control Devices* and NTTA and TxDOT guidelines.

Signs on the Project will be reflective to enhance nighttime visibility and will be designed to withstand appropriate wind loads for the given area. Roadside mounted signs and overhead signs will be utilized, as necessary, to ensure that the signs are clearly visible to the motorists. In addition to signs along the Project, trailblazer signs will be installed on major arterials in the vicinity of the Project to direct motorists to the nearest PGBT access.

Toll Collection

All toll-collection systems on the Project will be 100-percent open road tolling using an all electronic toll collection (ETC) system. Vehicles that are equipped with a TollTag or TxTag transponders will be tolled electronically as they travel through the toll gantries. Vehicles using the Project that do not have these transponders will have photos taken of their license plate and will be notified by mail of their tolls and be requested to obtain a transponder. All vehicles using the Project will be monitored with video-enforced toll collection systems.

A total of 12 ramp connections to or from the Project will have an overhead gantry to allow for placement of toll collection equipment. One main lane ETC gantry, located in Section 29 east of Merritt Road in Rowlett, will provide for six toll collection lanes (three each direction with provision for expansion to eight lanes) equipped with both TollTag and TxTag collection capability. All toll collection lanes are dedicated, non-stop express lanes to expedite the flow of traffic through the gantries, improve traffic safety and air quality, and provide for ease of maintenance.

Sound Mitigation

Where warranted in accordance with the TxDOT and NTTA sound mitigation policy, the NTTA is constructing sound walls to mitigate sound levels which exceed acceptable FHWA Noise Abatement Criteria along the Project. Through the environmental review process, it was determined that Sections 28, 30 and 31 required sound walls, while Sections 29 and 32 met the requirements for traffic noise abatement and do not require soundwalls.

Right of Way

The NTTA has the authority to acquire property, easements, and other interests in land by purchase or condemnation, as may be necessary for the construction, operation and maintenance of toll roads.

Based on the proposed location of roadways, bridges, toll gantries and intersections, the ROW limits have been established. These limits will permit proper maintenance of the PGBT. Based on the current plans for the Project, ROW and easement acquisition will be necessary for the entire corridor, including the displacement of approximately 26 residences, two apartment complexes and a historic structure (Coyle House). Approximately 463 acres of ROW, 395 displacements and a total of 154 parcels will be required. However, much of the corridor ROW width is through woodland areas or has been purposely undeveloped by the cities to accommodate the future roadway.

ROW estimates, as summarized in the cost estimates, reflect anticipated land values as determined by the NTTA staff and by Post, Buckley, Schuh & Jernigan, Inc. (PBS&J), the ROW acquisition team for the Project. These estimates were based on review of trends of previous acquisitions by the NTTA and TxDOT and average values that can be expected for the balance of required ROW acquisition. The cost estimates will be continually monitored until just prior to bond sale to ensure land values are properly budgeted. Prior to determining final ROW costs, a thorough review by PBS&J's and the NTTA's appraisers will be required. The estimated expenses for legal and court fees that are usually necessary in condemnation proceedings are included in the cost estimates. All ROW acquisition costs will be funded by a Toll Equity Grant (TEG) from TxDOT in the amount of $160 million.

Utility Adjustments

The Project is located in an area with various utilities. For most of the Project, a minor amount of utility relocation will be necessary. However, portions of Section 30 and 32 are heavily congested with various existing overhead and underground utilities that require relocation. It is anticipated that these adjustments will be made by the utility companies with the cost thereof reimbursed by the NTTA, with the exception of a few specific areas where the relocation may be included as part of the Project construction contract. All utility construction within the ROW will be subject to the inspection and approval of the NTTA's engineers. An estimate of NTTA costs for the utility adjustments required for the Project is included in the estimated Project cost and will be funded by the TxDOT TEG.

Public Involvement

Several public meetings and a public hearing were held as part of the initial environmental study for the corridor. A Record of Decision (ROD) from FHWA was received in January 2005 that considered public input. However, revisions to the Project in a few areas during the design process required an environmental re-evaluation. To meet the requirements of the re-evaluation process, a public meeting was held on January 29, 2008 to discuss the modifications to the project since the ROD was issued and provide the public an opportunity to comment on the proposed design and environmental re-evaluation. The Project received support from the affected governmental agencies and favorable comments from the public. Final documentation was submitted to TxDOT and FHWA and was approved in July 2008.

Environmental Considerations

An Environmental Impact Statement (EIS) was developed to determine the social, economic and environmental effects of the Project on the environment as required by the National Environmental Policy Act (NEPA) of 1969. This environmental document was cleared by the FHWA on January 24, 2005. As a result of revisions to the project per executed interlocal agreements with participating cities, including the change from optional cash tolling to all-ETC, the addition of the Merritt/Liberty Grove Connector interchange in Rowlett, the re-alignment of IH 30 and acquisition of additional ROW and easements, among other changes, an environmental re-evaluation was prepared for sections of the project impacted by these revisions and approved by the TxDOT Environmental Affairs Division and FHWA in July 2008.

Based on the investigations conducted, the Project will have no significant impacts on the quality of the human environment and have no serious effects on the factors that were evaluated. Implementation of the proposed all-ETC tolling of the Project would not appreciably increase the potential for impacts beyond those considered in previous environmental documents and subsequent/anticipated approvals. No further environmental documentation beyond the aforementioned documents would be required. The design and construction of the Project will be compliant with NEPA and adhere to environmental commitments contained in the approved environmental documents.

The commercial and residential development that results from the construction of the Project is expected to have a positive economic impact. Improving the mobility in the area is anticipated to make the parcels of land adjacent to the proposed corridor more attractive, resulting in increased land value. In addition, the commercial development should increase the tax base in the area and provide additional jobs. The corridor is expected to also have a positive economic effect on the properties in the surrounding area due to the improved mobility and access. The proposed Project alignment will improve residents' access to other areas of the Dallas-Fort Worth region.

This Project meets all air- and water-quality requirements, even considering the revisions to the Project's original schematic. An air-quality analysis was conducted by modeling the anticipated carbon monoxide (CO) levels resulting from the Project. It was determined that the Project would not adversely impact CO levels. The Project will not hinder the Texas State Implementation Plan to meet national ambient air-quality standards. In addition, no long-term water-quality impacts are expected from the Project. Control measures will be taken during the construction process to minimize water pollution. These measures include preserving existing vegetation, limiting the amount of disturbed earth and utilizing temporary erosion control practices.

Re-evaluation of noise impacts was performed based on revisions to the project and revised traffic projections. With the addition of sound walls in certain areas, the Project should not have a significant impact on exterior noise levels according to the Noise Abatement Criteria for the Design Year 2030 as defined by the *Guidelines for Analysis and Abatement of Highway Traffic Noise*.

Other environmental considerations for the project are an archaeological site located in Section 28 and a historic home (Coyle House) within the existing ROW in Section 30 of the project. Based on conditions of the environmental re-evaluation

approval, work may not begin in a limited area of this section until archaeological surveys have been completed, which are scheduled for completion by August 2009. The future site of the Coyle House has been determined based on a five-party mitigation agreement between the NTTA, TxDOT, FHWA, the City of Rowlett, and the Texas Historic Commission. Preliminary site development is underway and the house is scheduled for relocation by March 2009.

Commitments and Permits

A Section 404 individual permit for the proposed construction of the Project from SH 78 to IH 30 must be acquired by NTTA prior to construction. Formal coordination with the United States Army Corps of Engineers (USACE) has been ongoing and is required prior to any nationwide permit being issued. Environmental permits, issues and commitment sheets have been prepared for each section of the project, as required by TxDOT, that document the commitments made in the Final Environmental Impact Statement (FEIS) and ROD for contractor compliance during construction. The 404 permit was acquired in April 2008.

Project Cost Estimates

Quantities of major construction items were estimated based on construction plans at the 100-percent completion level. Major items include grading, drainage, paving, bridges, retaining walls and other construction-related items. The estimated quantities and the unit prices for construction items on similar NTTA and TxDOT projects in the Dallas area were used to estimate the total construction cost. The estimated unit prices expected to be received through the competitive bidding process in the year 2008 were used to establish project costs.

Table 1 shows a summary of the estimated project costs for the Project. The total Project costs include engineering, design, construction, ROW, legal, administrative, material-testing and utility-relocation costs that are NTTA's responsibility. The estimated total cost for the proposed Project is $1,039,751,554 (adjusted for inflation) to be funded by the NTTA, TxDOT, and participating cities. Per the 2PA, TxDOT is providing for the design, construction, and construction support of Section 32 (approximately $254 million) as well as a TEG in the amount of $160 million to be used for right-of-way acquisition, utility relocations, or any other items for the Project agreed to mutually between NTTA and TxDOT. In addition, the NTTA has executed interlocal agreements with the Cities of Garland, Rowlett, and Sachse; the combined contributions from these cities are approximately $16 million. Therefore, the NTTA is responsible for approximately $610 million of the total Project cost.

Several factors, including unforeseen escalation of prices and wages, labor or material shortages and changes in economic conditions, can significantly affect (escalate or reduce) construction costs. The estimated Project cost reflects the professional judgment of the current construction industry and with future adjustment for inflation, it is our belief that the various sections of the Project can be constructed within the limits described for the estimated cost given herein. However, due to the nature of the construction industry, we are unable to and will not guarantee that the actual Project costs will not vary from the estimated cost.

Table 1: Estimated Cost Summary

No.	Description	Cost
1	Section 28	$115,290,480
2	Section 29	$74,852,452
3	Section 30	$152,596,887
4	Section 31	$60,133,710
5	Section 32	$187,779,718
6	Toll Gantries, Equipment	$31,249,709
7	Construction Management	$51,300,198
8	Construction Contingency	$83,580,853
9	Miscellaneous Construction*	$22,317,593
Subtotal (1-9) Construction		$779,101,600
10	Plans, Specifications and Estimates and Administrative Costs	$48,614,277
11	ROW Acquisition	$140,200,000
12	Utility Relocations	$26,644,730
13	Other Agency Costs	$11,095,916
14	Agency Cost Contingency	$34,095,032
Subtotal (10-14) Agency Costs		$260,649,955
Project Total (1-14)		$1,039,751,554

**Miscellaneous construction cost includes landscape, ITS equipment and other special features.*

Construction Schedule

Since the environmental re-evaluation has been approved, the USACE permit has been obtained, and interlocal agreements with TxDOT, DART, and the Cities of Garland, Rowlett, Sachse, and Dallas have been executed, construction of the Project is expected to begin in August 2008 and is anticipated to be open to traffic by late 2011.

Designs of the Project sections, including Section 32 by TxDOT, have been completed or have been submitted to TxDOT for final review and approval. The NTTA will modify, as necessary, the designs of those sections remaining to be approved based on review comments from TxDOT, which are expected to be minor in nature. The review, modification, and completion of the design plans and specifications are an essential element in maintaining the construction schedule and open to traffic date. These plans will also have to be coordinated with utility relocations to aid in providing a clear ROW for the Project construction, as many utilities will need to be relocated prior to construction. Each of the five sections of the Project has varying construction start times and durations, which are shown in Table 2.

Table 2: Construction Schedule

Section	Construction Start	Construction Duration	Construction Complete[1]	Open to Traffic
28	October 2008	38 months	December 2011[2]	Late 2011
29	December 2008	24 months	January 2011	Late 2011
30	August 2008	40 months	December 2011	Late 2011
31	February 2009	24-30 months	August 2011	Late 2011
32	October 2008	36 months	October 2011	Late 2011

[1]Sections 28, 29, 31 and 32 are not able to open to traffic until Section 30 is complete due to traffic control and capacity issues on ramps and adjacent side streets.

[2]The main lanes will be complete and open to traffic in late 2011 with the rest of the corridor. For traffic control purposes, the Crist Road ramps will not be constructed until the entire corridor is open to traffic. This construction extends approximately 3 months beyond the open to traffic date.

Based on experience with similar projects and because of the usually favorable construction weather prevailing in the Dallas region, such a schedule appears realistic. However, the schedule set forth in this report could vary depending upon ROW availability, utility clearances, unforeseen geologic conditions, adverse weather, experience of contractors and their personnel, force majeure events and other factors not within the control of the NTTA.

Operation and Maintenance

Estimated costs of operations and maintenance of the NTTA system, including increases in operating costs associated with the Project, have been prepared.

Estimates are based on the NTTA's current system operations and maintenance model. In addition, the estimates also assume that NTTA will continue to operate under the administration and management that currently exists and will continue to operate in a manner that will fulfill the commitments as set forth in agreements with TxDOT. For this project, the NTTA will operate the entire project and will maintain the main lanes and ramps, while TxDOT is responsible for maintaining the frontage roads. According to the executed Two-Party Agreement between TxDOT and the NTTA, the NTTA will reimburse TxDOT for their frontage road operating expenses in the amount of $10,000 per lane mile per year.

The total costs of administration, management, maintenance of roadways and structures, electronic toll collection, contract maintenance activity and miscellaneous other costs associated with the operation of the system are included in the estimates. These estimates are escalated 2.75% per year beginning one year after the open to traffic date. The estimated annual Operations and Maintenance Fund and Reserve Maintenance Fund expenses for the Project are as given in Table 3 on page 11.

Table 3: Estimate of Annual Operations and Maintenance Expense

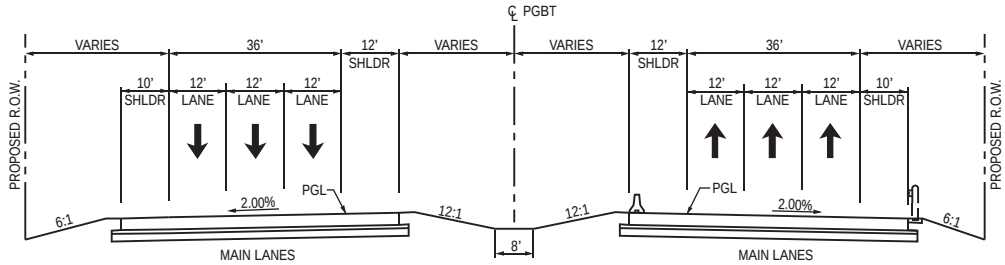
Year	Existing NTTA System	PGBT EE	Proposed NTTA System Including PGBT EE	Reserve Maintenance Fund Estimate for PGBT EE	Year	Existing NTTA System	PGBT EE	Proposed NTTA System Including PGBT EE	Reserve Maintenance Fund Estimate for PGBT EE
2011	111,418,284	1,187,736	112,606,020	0	2037	225,760,095	19,008,493	244,768,588	706,745
2012	114,486,004	8,666,785	123,152,789	221,247	2038	231,975,758	19,598,237	251,573,995	65,185,674
2013	117,637,074	9,041,439	126,678,513	301,515	2039	238,362,748	20,201,934	258,564,682	4,492,224
2014	120,876,318	9,407,342	130,283,660	237,006	2040	244,925,762	20,853,304	265,779,066	616,443
2015	124,204,612	9,969,171	134,173,783	630,084	2041	251,669,592	21,500,064	273,169,657	10,789,526
2016	127,624,882	10,441,952	138,066,833	3,703,439	2042	258,600,141	22,166,859	280,767,001	3,626,018
2017	131,138,106	10,491,664	141,629,770	344,659	2043	265,721,415	22,852,057	288,573,472	6,789,371
2018	134,748,319	10,517,762	145,266,080	2,257,552	2044	273,039,532	23,561,009	296,600,541	707,383
2019	138,458,610	10,520,952	148,979,562	2,291,119	2045	280,558,721	24,325,125	304,883,846	83,127,094
2020	142,270,127	10,505,048	152,775,175	309,803	2046	288,283,331	25,049,606	313,332,937	9,497,228
2021	146,188,075	10,876,752	157,064,827	7,801,892	2047	296,220,828	25,800,942	322,021,770	2,504,520
2022	150,212,722	11,262,231	161,474,953	331,869	2048	304,377,800	26,571,944	330,949,744	811,738
2023	154,349,397	11,662,394	166,011,791	1,342,033	2049	312,759,965	27,366,299	340,126,264	4,831,267
2024	158,598,493	12,079,008	170,677,501	355,506	2050	321,372,166	28,222,452	349,594,618	6,727,382
2025	162,965,469	12,927,403	175,892,873	2,830,469	2051	330,221,383	29,068,411	359,289,794	15,307,857
2026	167,452,852	13,345,990	180,798,842	5,224,066	2052	339,315,732	29,939,683	369,255,415	105,515,693
2027	172,062,238	13,792,977	185,855,215	2,421,837	2053	348,659,467	30,837,021	379,496,487	6,297,704
2028	176,798,295	14,240,946	191,039,241	407,952	2054	358,260,989	31,758,280	390,019,269	997,833
2029	181,666,763	14,707,201	196,373,963	1,148,799	2055	368,126,849	32,758,636	400,885,485	3,290,374
2030	186,668,459	15,203,790	201,872,248	437,008	2056	378,265,748	33,743,125	412,008,872	12,262,621
2031	191,808,276	15,700,175	207,508,451	59,467,914	2057	388,681,543	34,753,579	423,435,122	8,838,096
2032	197,090,189	16,214,766	213,304,954	3,345,846	2058	399,385,256	35,798,214	435,183,469	1,145,036
2033	202,517,252	16,746,454	219,263,706	617,890	2059	410,382,070	36,870,435	447,252,505	136,831,921
2034	208,093,603	17,297,837	225,391,440	3,879,721	2060	421,683,342	38,036,129	459,719,471	7,377,490
2035	213,822,470	17,887,963	231,710,433	3,994,601	2061	433,294,601	39,174,439	472,469,040	14,243,628
2036	219,710,165	18,438,628	238,148,793	3,750,202					

Note: To determine operation and maintenance cost for the proposed project, an estimate of the personnel and expenses required to operate each department was developed. The sum of these expenses comprises the PGBT EE cost estimate in 2007 dollars. This estimate was then escalated by a rate of 2.75% per year.

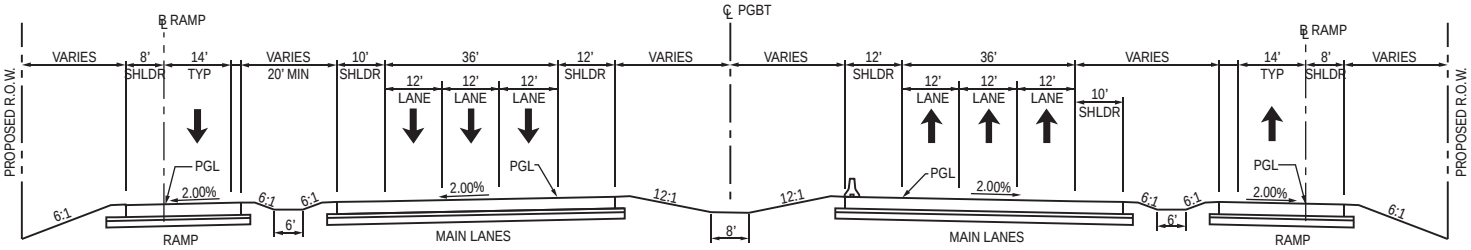
Appendix

Appendix Table of Contents

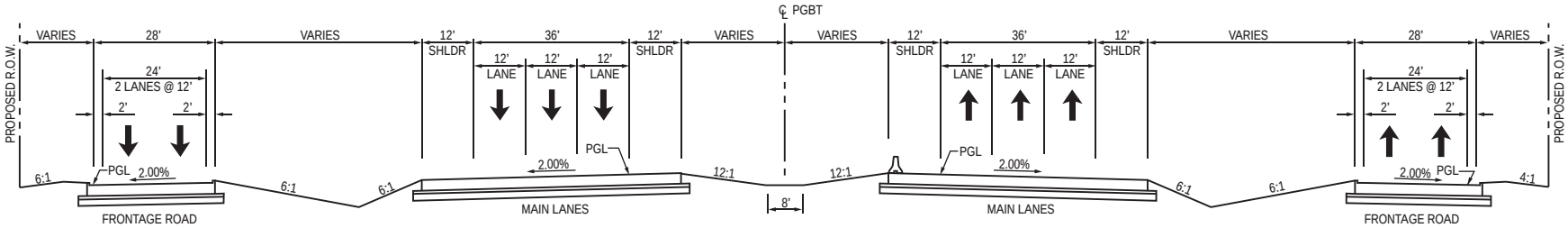
Typical Sections



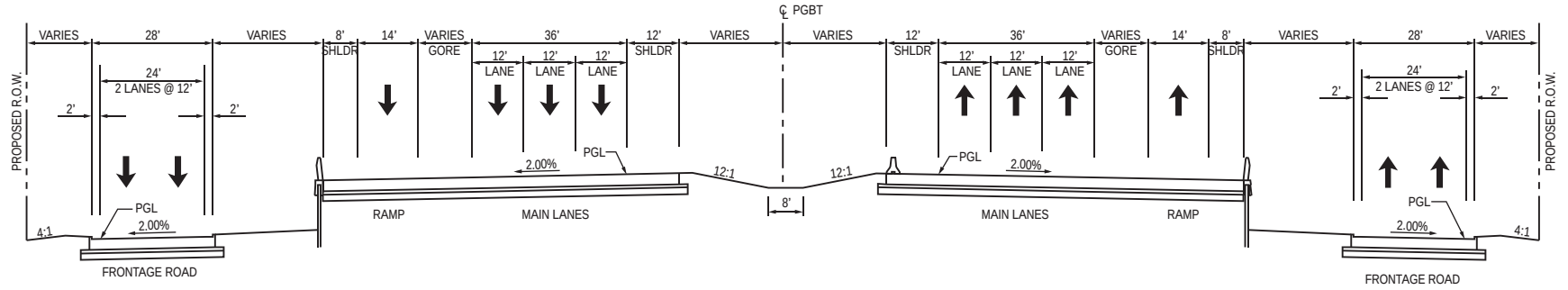
PGBT Eastern Extension – Typical Section, Main Lanes Only



PGBT Eastern Extension – Typical Section, Main Lanes with Ramps



PGBT Eastern Extension – Typical Section, Main Lanes with Frontage Roads

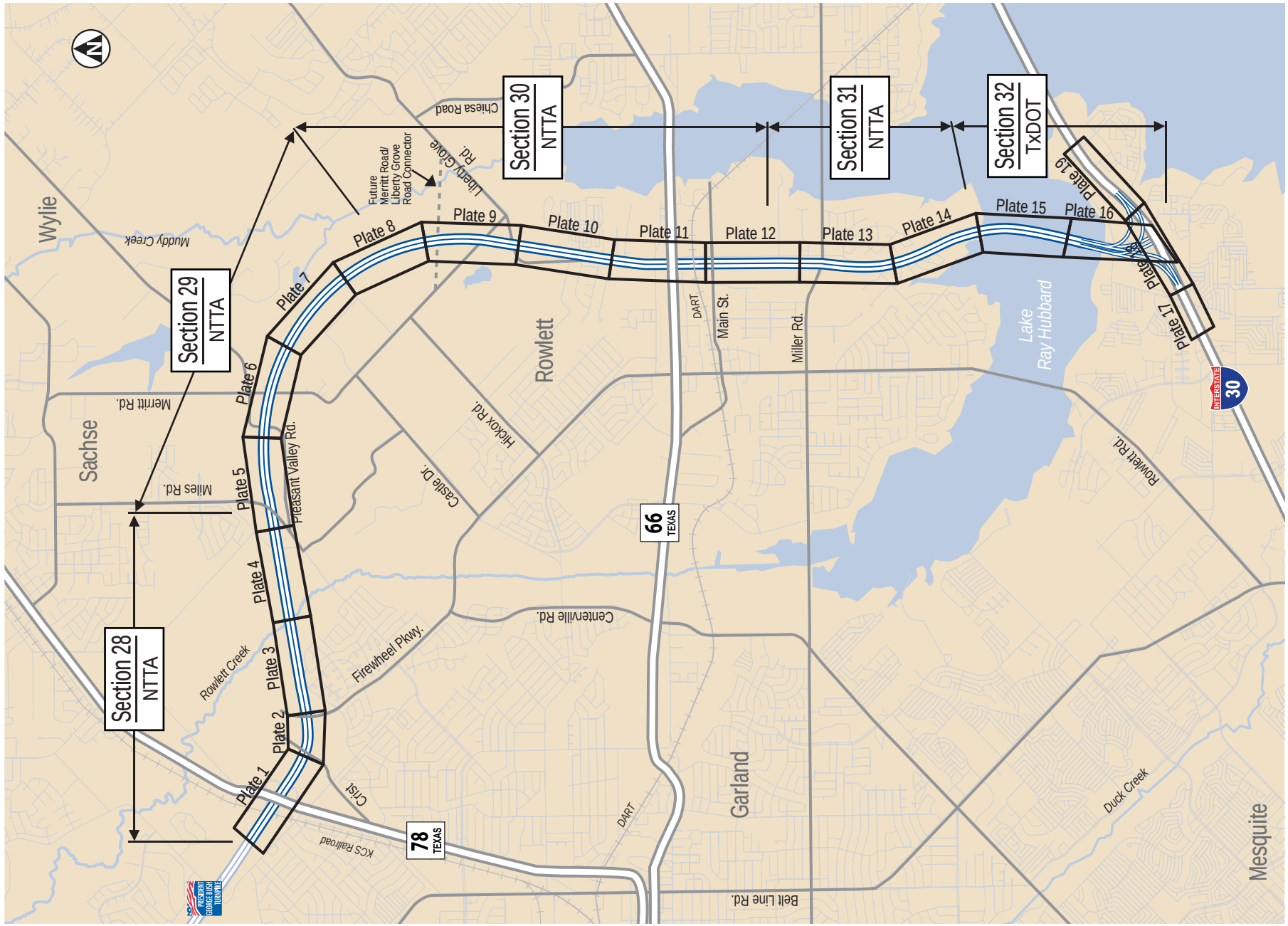


PGBT Eastern Extension – Typical Section, Main Lanes with Ramps and Frontage Roads

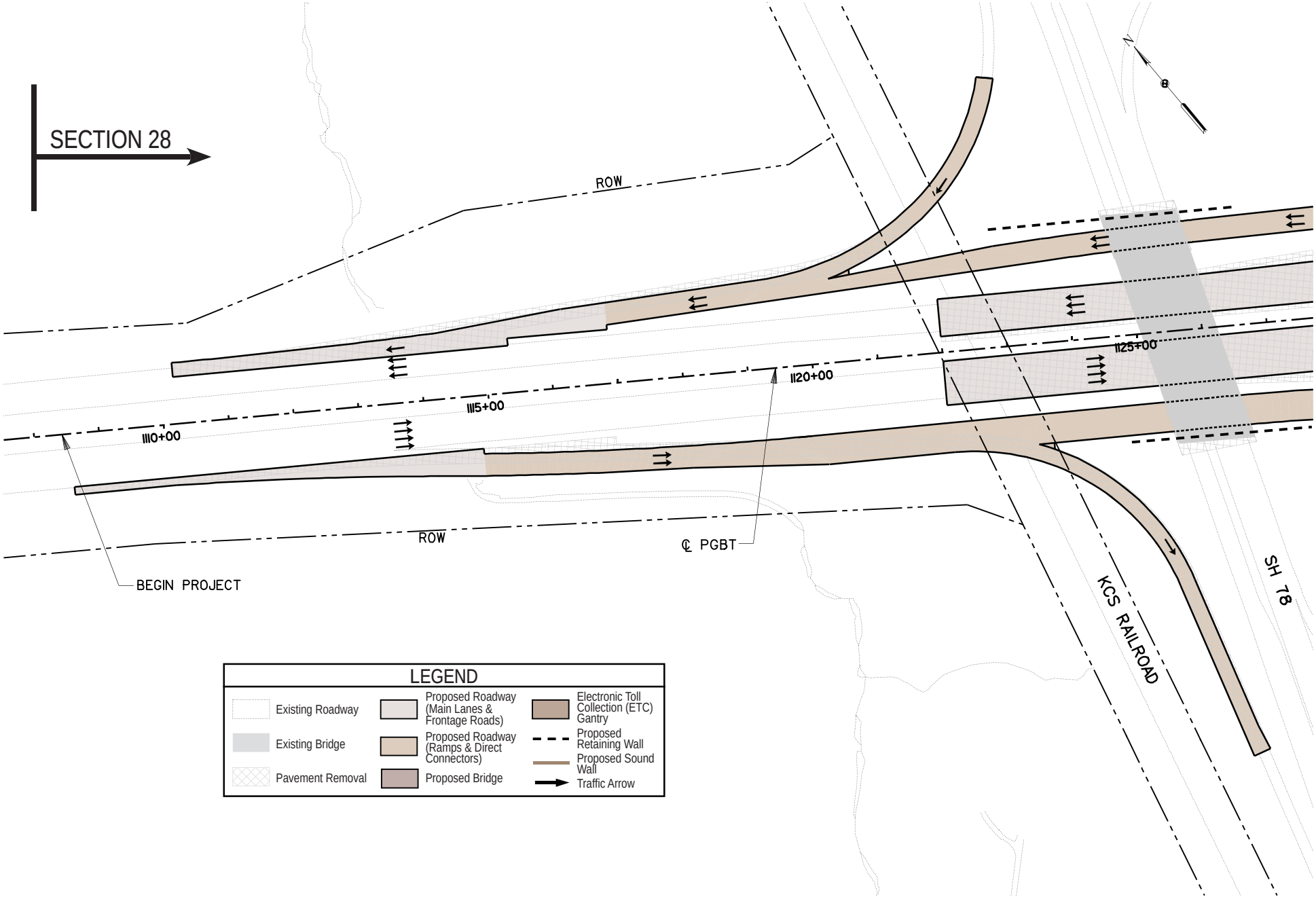
Acronym Definitions

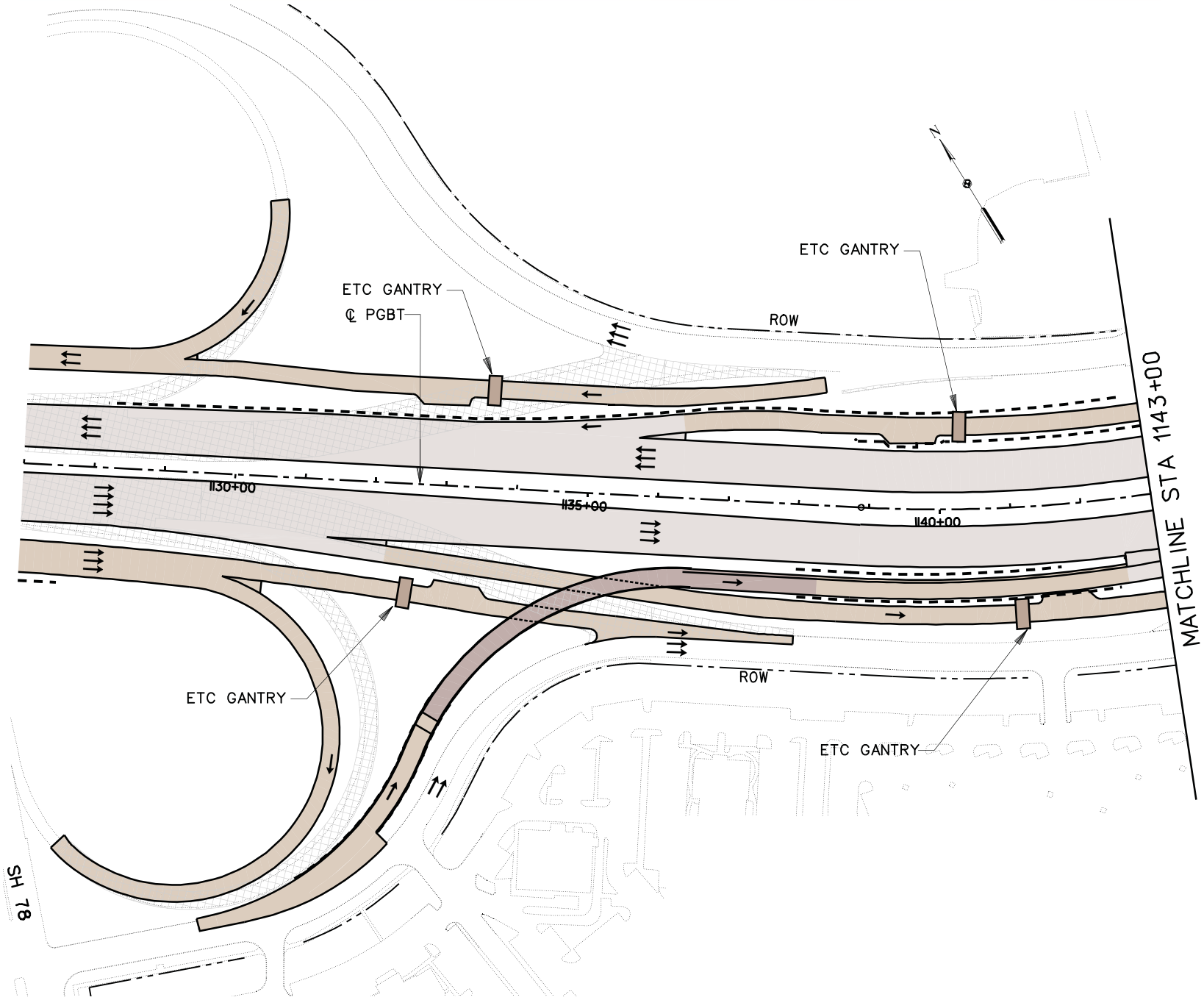
Table 4: Acronym Definitions

Acronym	Definition	Acronym	Definition
AASHTO	American Association of State Highway and Transportation Officials	MSE walls	mechanically stabilized earth walls
B	base line	NB	north bound
C	center line	NEPA	National Environmental Policy Act
CO	carbon monoxide	NTTA	North Texas Tollway Authority
CRCP	continuously reinforced portland cement concrete	O&M	Operation and Maintenance
CSS	cement stabilized subgrade	PBS&J	Post, Buckley, Schuh & Jernigan, Inc.
DART	Dallas Area Rapid Transit	PGBT	President George Bush Turnpike
DMS	dynamic message signs	PGBT EE	President George Bush Turnpike Eastern Extension
EB	east bound	ROD	record of decision
EIS	environmental impact statement	ROW	right of way
ETC	electronic toll collection	RR	railroad
FEIS	final environmental impact statement	SB	south bound
FHWA	Federal Highway Administration	SH	state highway
IH	interstate highway	TxDOT	Texas Department of Transportation
ITS	Intelligent Transportation System	USACE	United States Army Corps of Engineers
KCS	Kansas City Southern	WB	west bound
mph	miles per hour		


Section 28
NTTA
Section 29
NTTA
Section 30
NTTA
Section 31
NTTA
Section 32
TxDOT
Plate 1
Plate 2
Plate 3
Plate 4
Plate 5
Plate 6
Plate 7
Plate 8
Plate 9
Plate 10
Plate 11
Plate 12
Plate 13
Plate 14
Plate 15
Plate 16
Plate 17
Plate 18
Plate 19
Wylie
Sachse
Rowlett
Garland
Mesquite
Lake Ray Hubbard
Muddy Creek
Merritt Rd.
Miles Rd.
Pleasant Valley Rd.
Hickox Rd.
Castle Dr.
Chiesa Road
Future Merritt Road/ Liberty Grove Road Connector
Liberty Grove Rd.
Centerville Rd.
Firewheel Pkwy.
Rowlett Creek
Main St.
Miller Rd.
Rowlett Rd.
Belt Line Rd.
Duck Creek
DART
CTST
KCS Railroad
66 TEXAS
78 TEXAS
30 INTERSTATE

Index Map


SECTION 28
ROW
1110+00
1115+00
1120+00
1125+00
BEGIN PROJECT
ROW
℄ PGBT
KCS RAILROAD
SH 78
LEGEND
Existing Roadway
Existing Bridge
Pavement Removal
Proposed Roadway (Main Lanes & Frontage Roads)
Proposed Roadway (Ramps & Direct Connectors)
Proposed Bridge
Electronic Toll Collection (ETC) Gantry
Proposed Retaining Wall
Proposed Sound Wall
Traffic Arrow


ETC GANTRY
ETC GANTRY
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ROW
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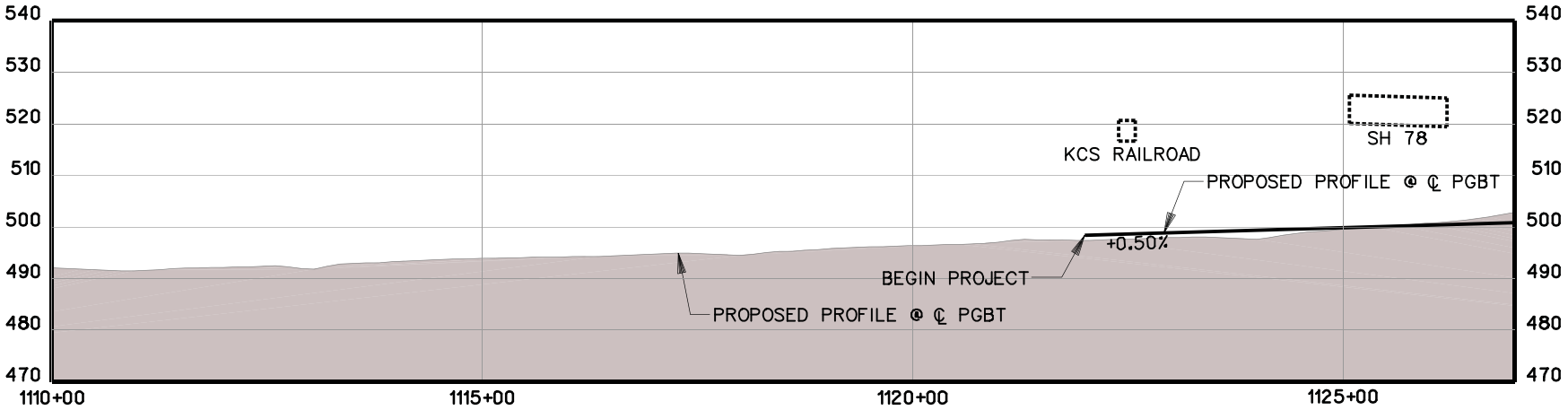
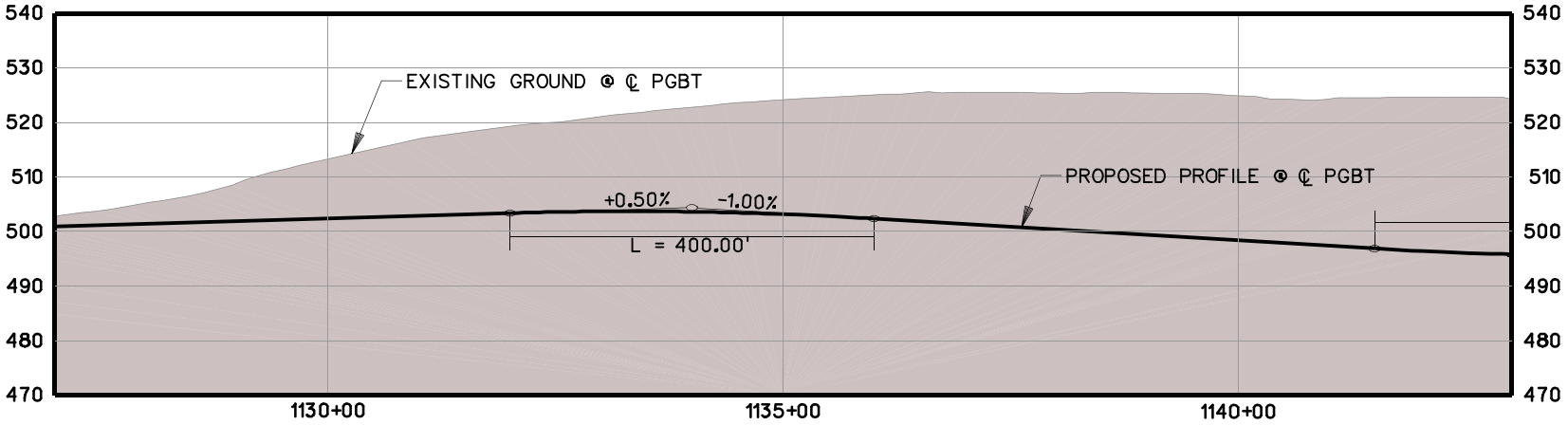
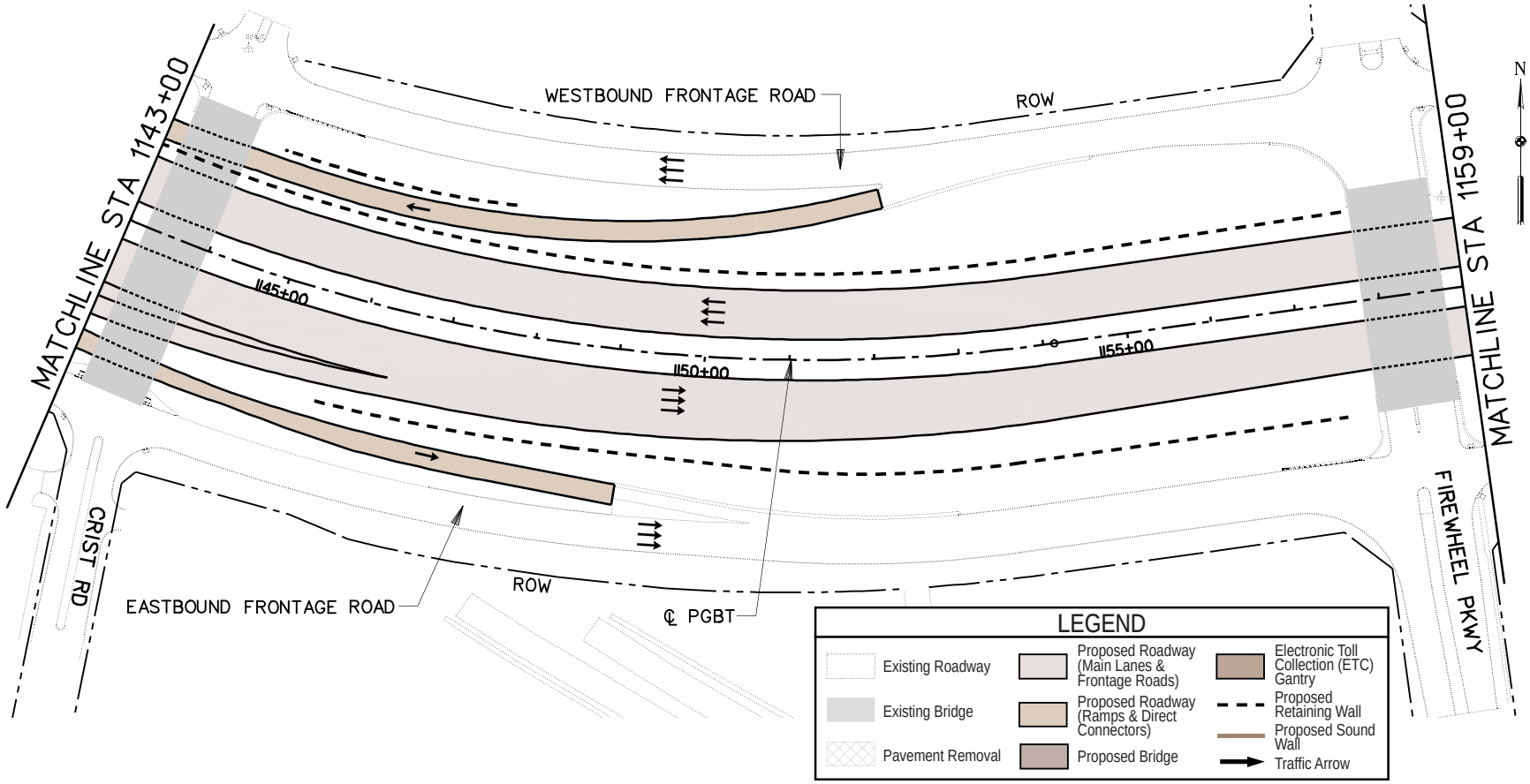
ETC GANTRY
ROW
ETC GANTRY
SH 78

Plate 1 Profiles






MATCHLINE STA 1143+00
WESTBOUND FRONTAGE ROAD
ROW
MATCHLINE STA 1159+00
N
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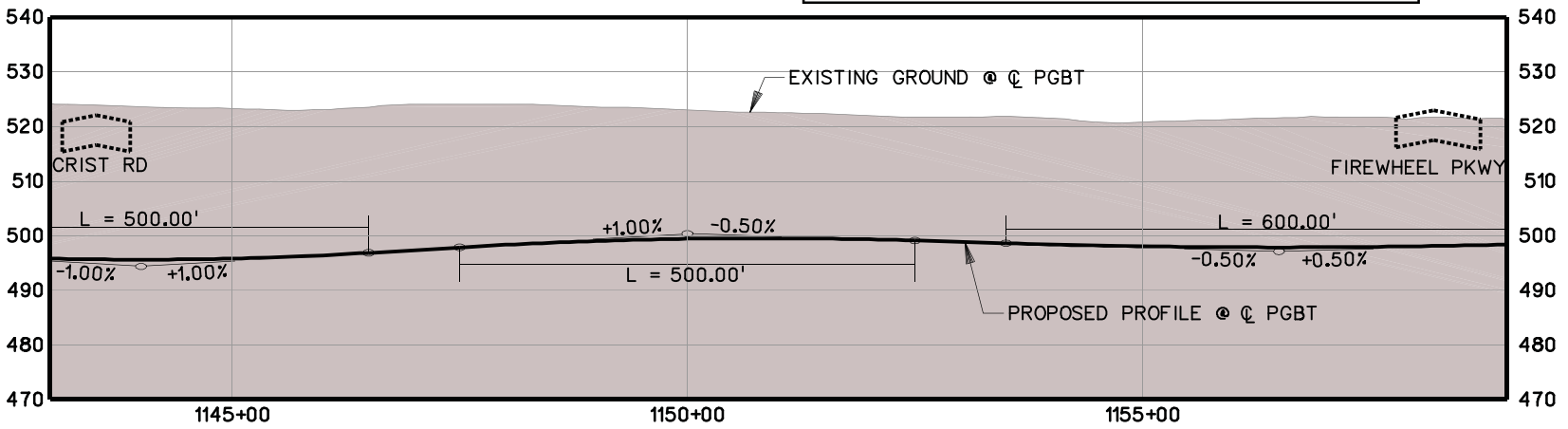
CRIST RD
EASTBOUND FRONTAGE ROAD
ROW
℄ PGBT
FIREWHEEL PKWY
LEGEND
Existing Roadway
Existing Bridge
Pavement Removal
Proposed Roadway (Main Lanes & Frontage Roads)
Proposed Roadway (Ramps & Direct Connectors)
Proposed Bridge
Electronic Toll Collection (ETC) Gantry
Proposed Retaining Wall
Proposed Sound Wall
Traffic Arrow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470
EXISTING GROUND @ ℄ PGBT
CRIST RD
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L = 500.00'
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+1.00%
+1.00%
-0.50%
L = 500.00'
L = 600.00'
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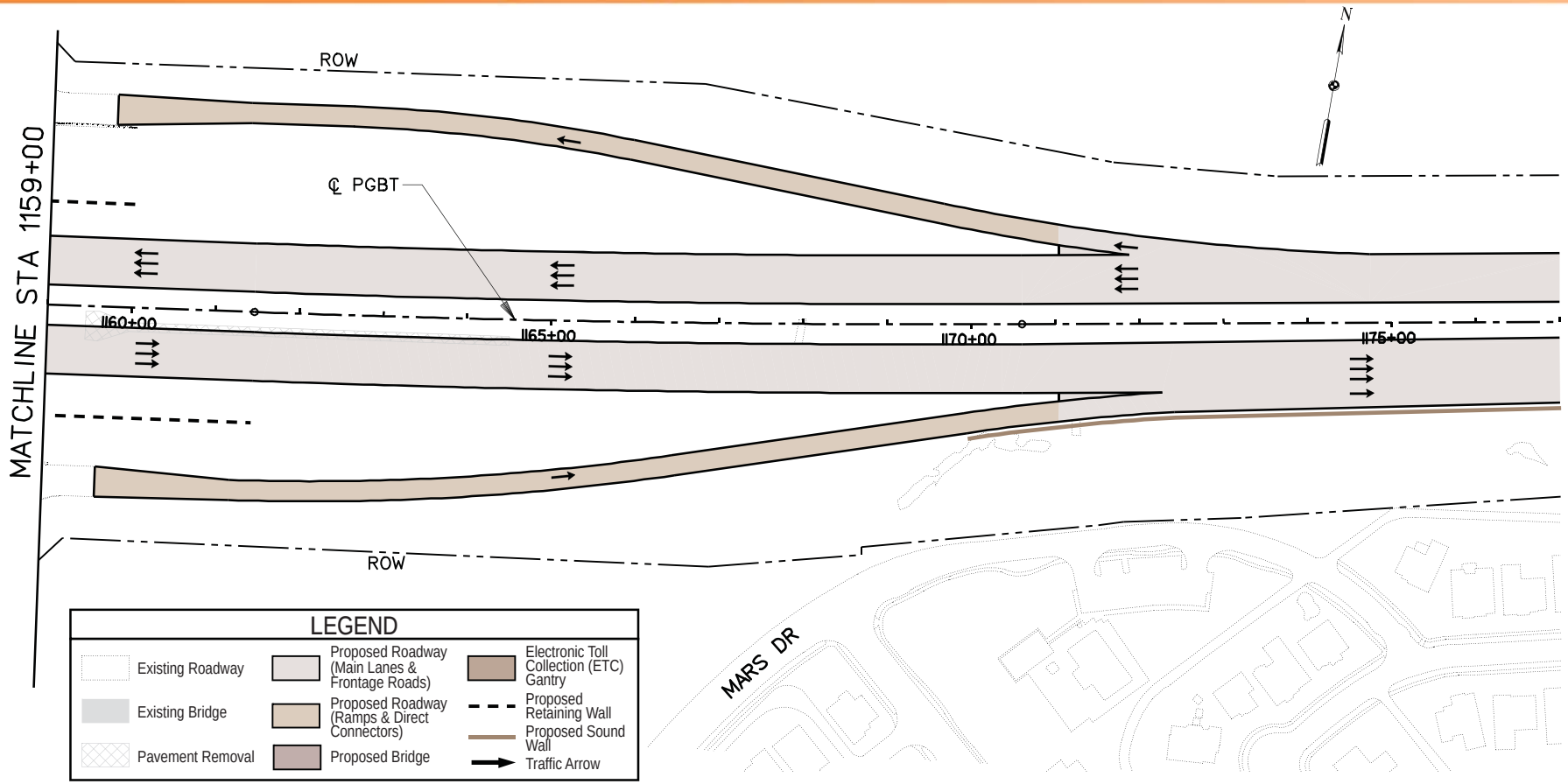
PROPOSED PROFILE @ ℄ PGBT
1145+00
1150+00
1155+00


N
ROW
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MATCHLINE STA 1159+00
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1170+00
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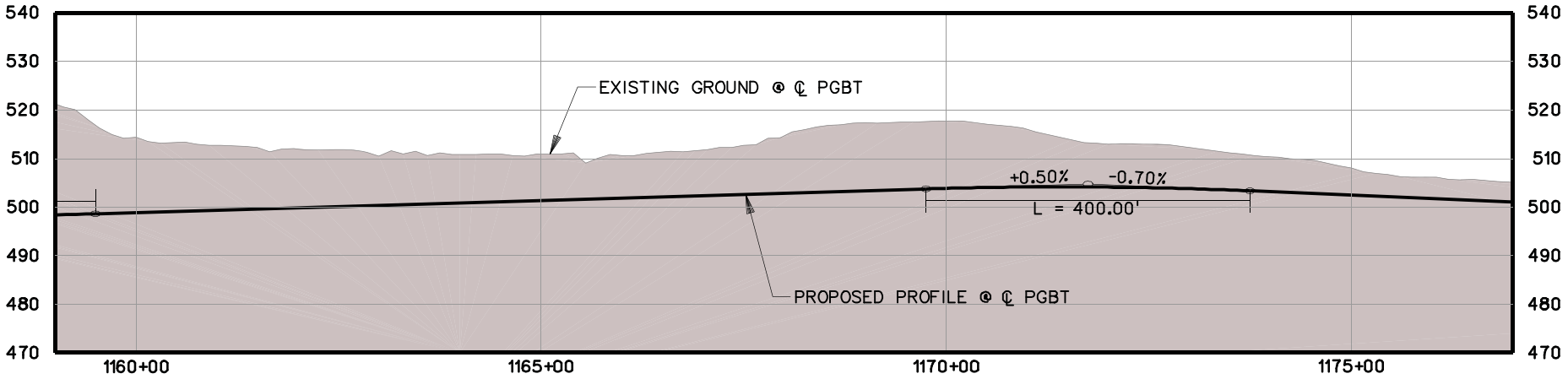
ROW
MARS DR
LEGEND
Existing Roadway
Existing Bridge
Pavement Removal
Proposed Roadway (Main Lanes & Frontage Roads)
Proposed Roadway (Ramps & Direct Connectors)
Proposed Bridge
Electronic Toll Collection (ETC) Gantry
Proposed Retaining Wall
Proposed Sound Wall
Traffic Arrow


540
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EXISTING GROUND @ ℄ PGBT
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-0.70%
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PROPOSED PROFILE @ ℄ PGBT
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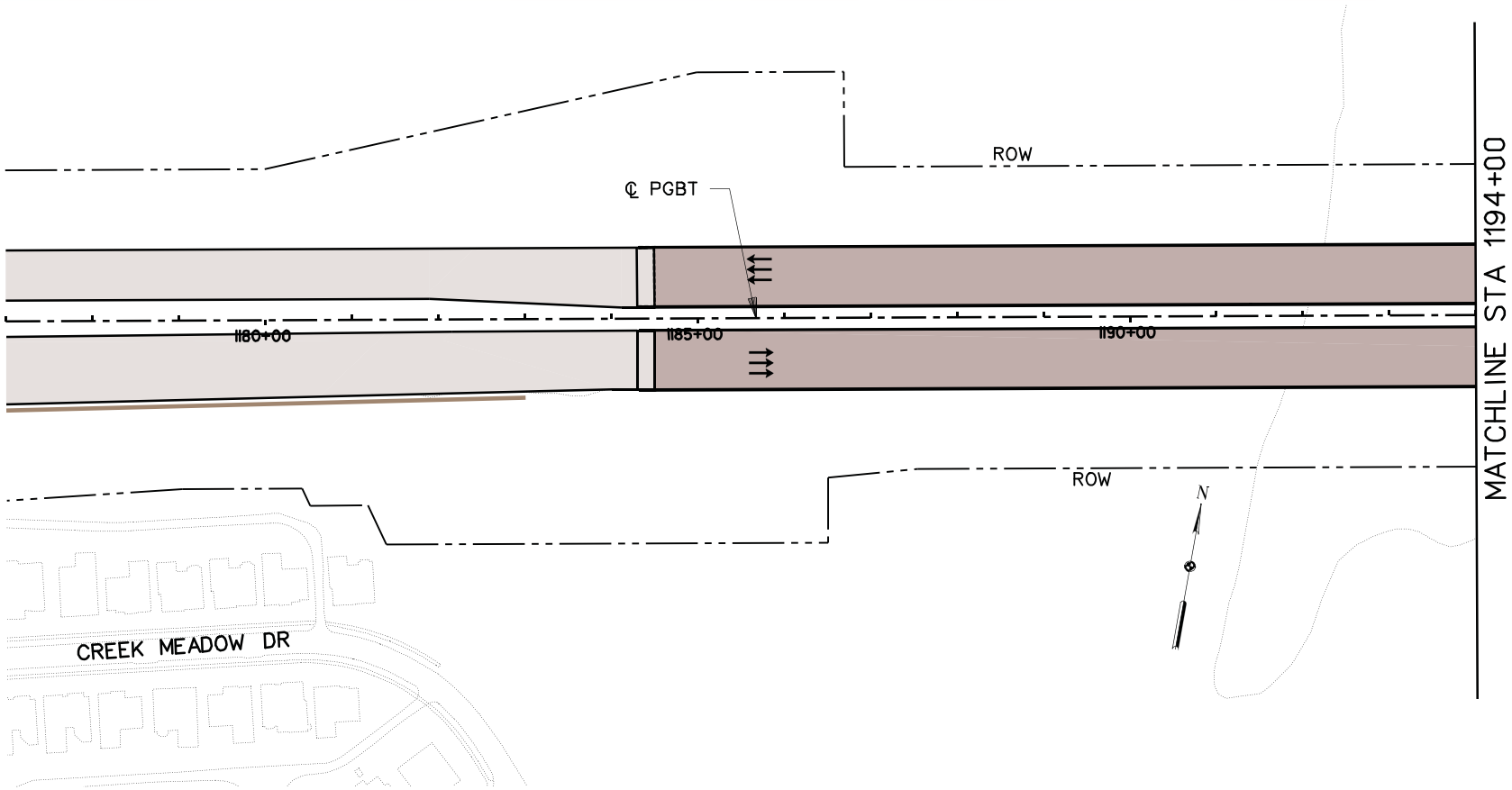
1165+00
1170+00
1175+00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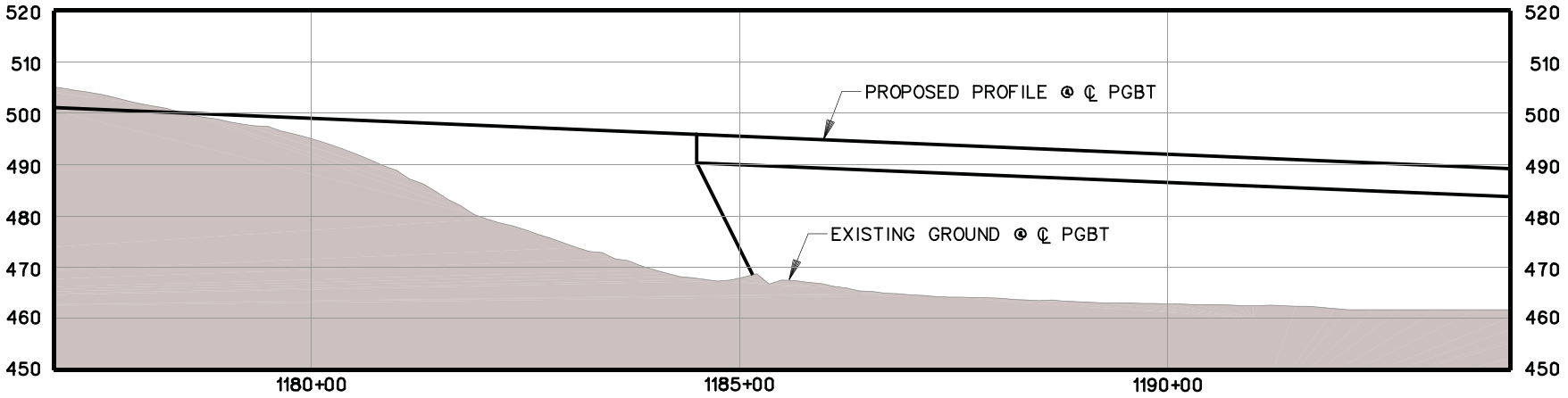
ROW
MATCHLINE STA 1194+00
N
CREEK MEADOW DR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PROPOSED PROFILE @ ℄ PGBT
EXISTING GROUND @ ℄ PGBT
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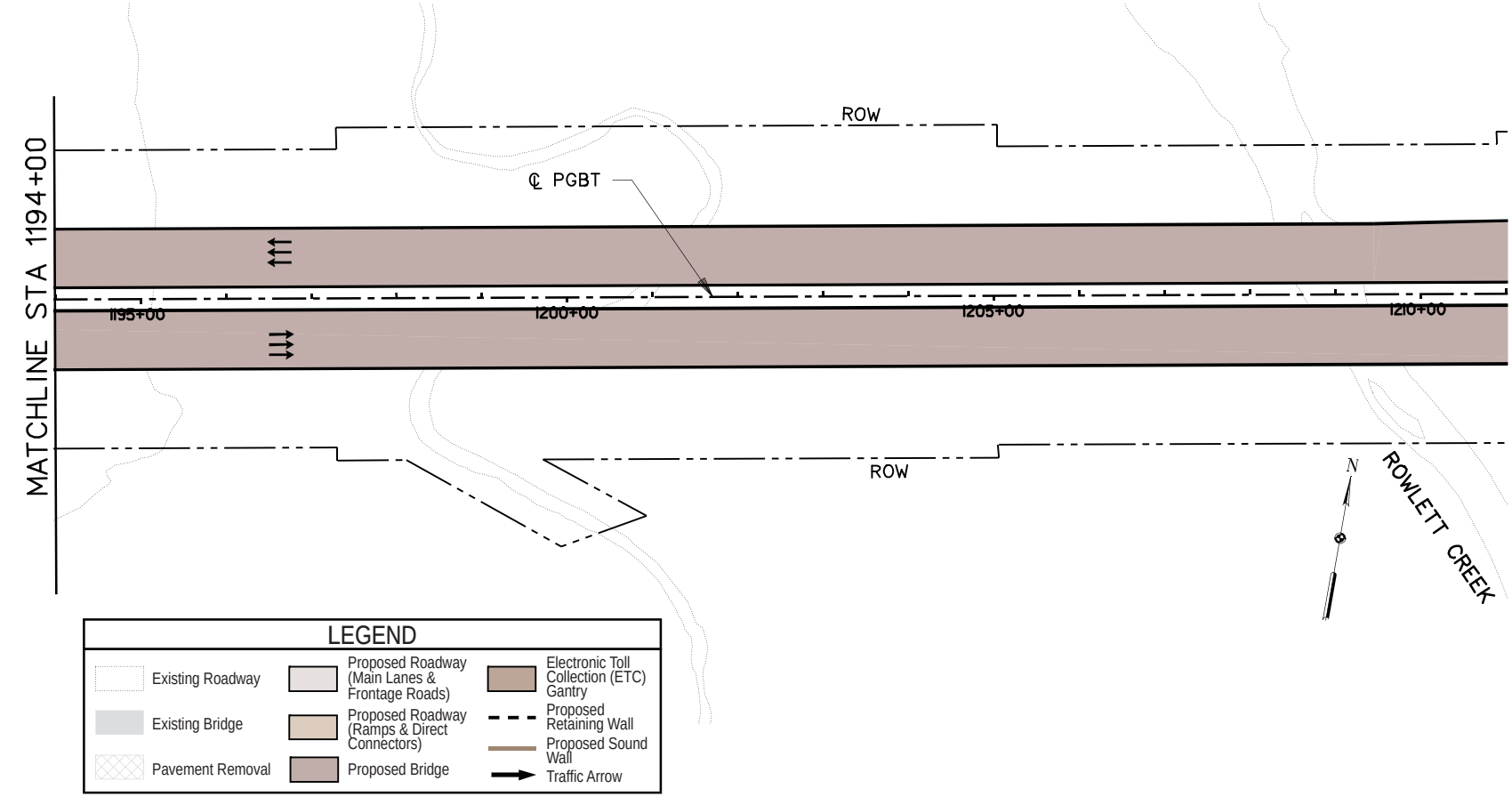
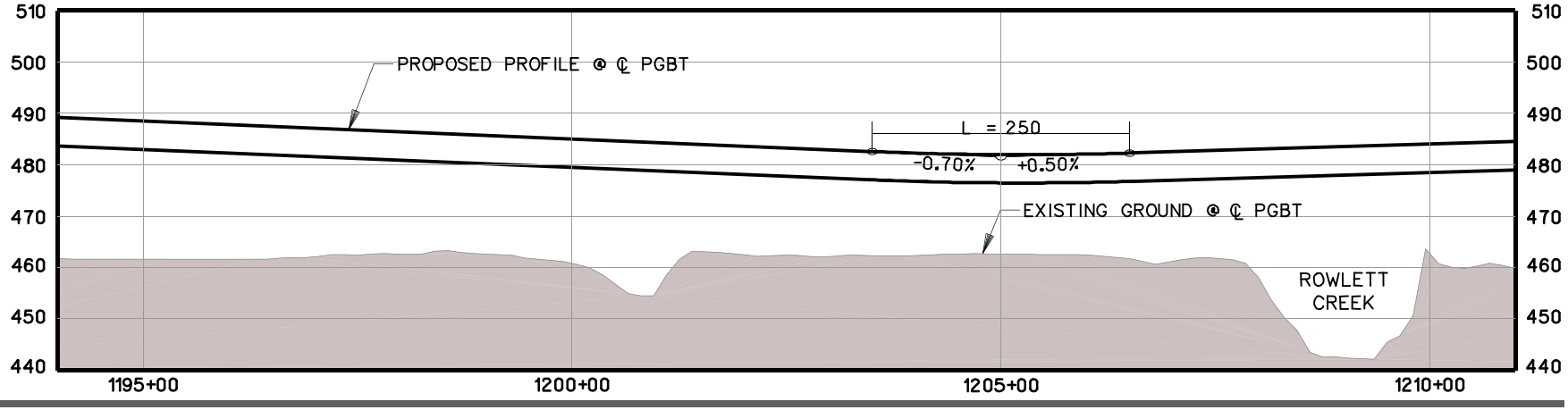
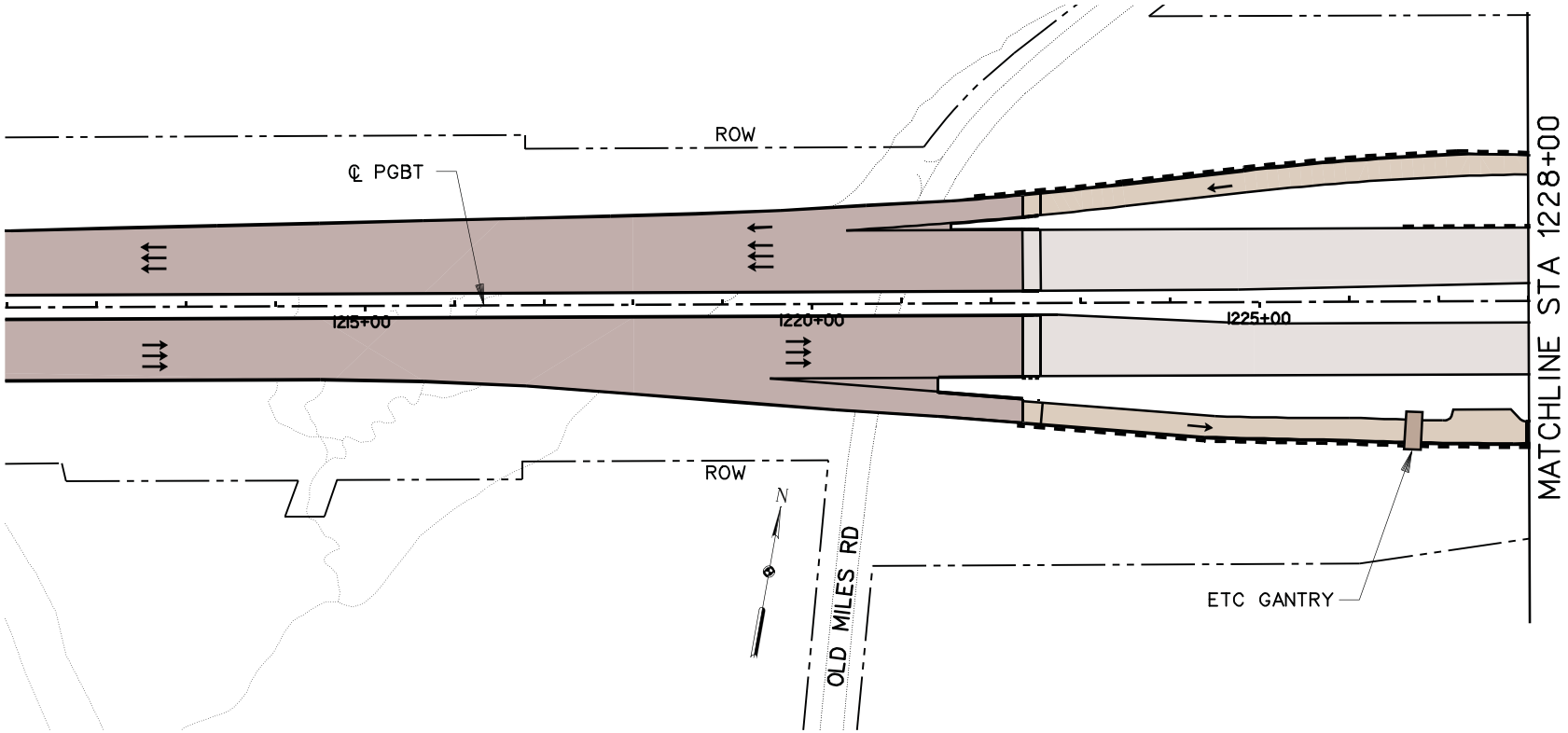
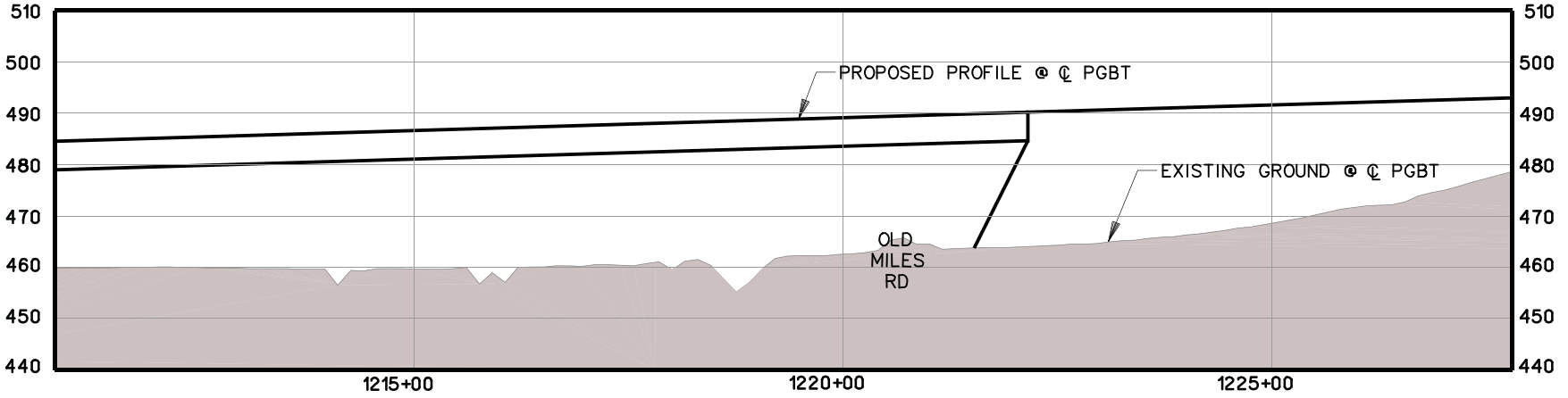
1185+00
1190+00

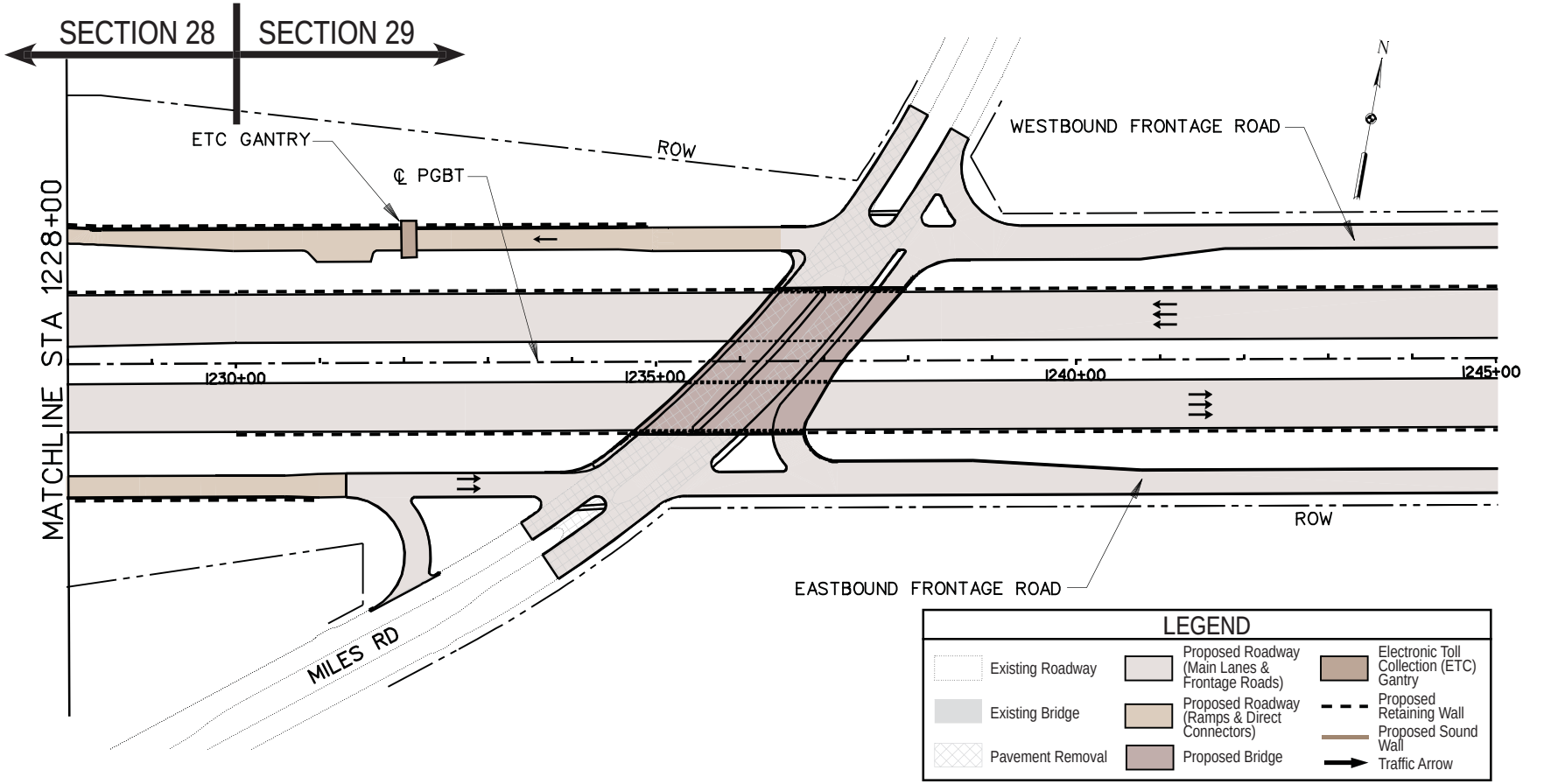

MATCHLINE STA 1194+00
ROW
℄ PGBT
1195+00
1200+00
1205+00
1210+00
ROW
N
ROWLETT CREEK

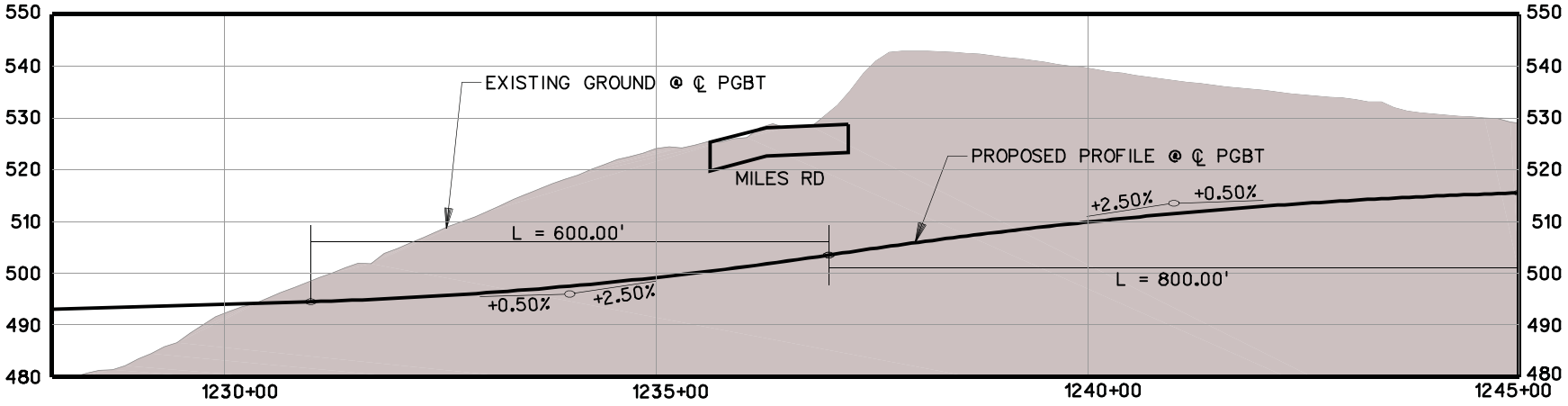
LEGEND
Existing Roadway
Existing Bridge
Pavement Removal
Proposed Roadway (Main Lanes & Frontage Roads)
Proposed Roadway (Ramps & Direct Connectors)
Proposed Bridge
Electronic Toll Collection (ETC) Gantry
Proposed Retaining Wall
Proposed Sound Wall
Traffic Arrow

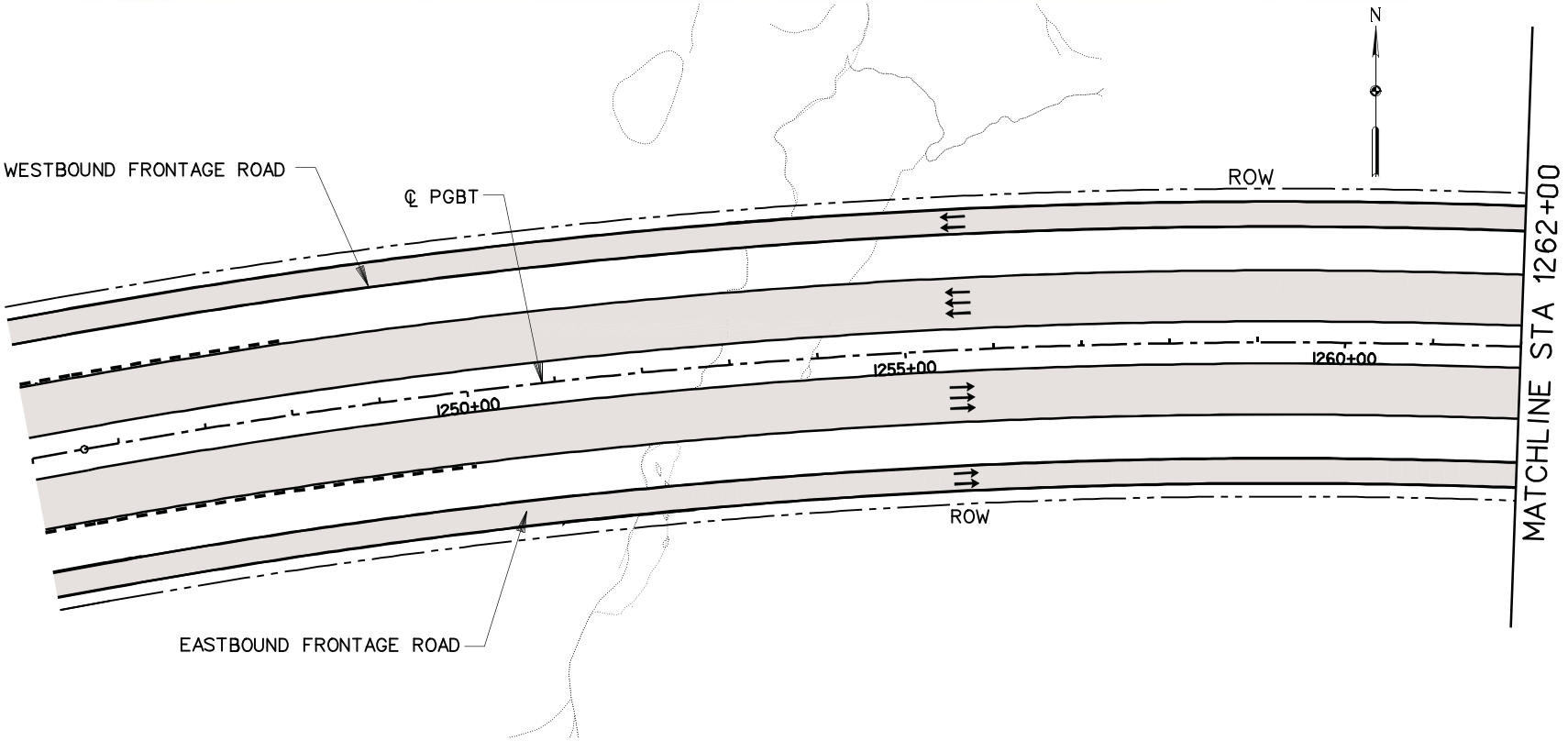

510
500
490
480
470
460
450
440
PROPOSED PROFILE @ ℄ PGBT
L = 250
-0.70%
+0.50%
EXISTING GROUND @ ℄ PGBT
ROWLETT CREEK
1195+00
1200+00
1205+00
1210+00

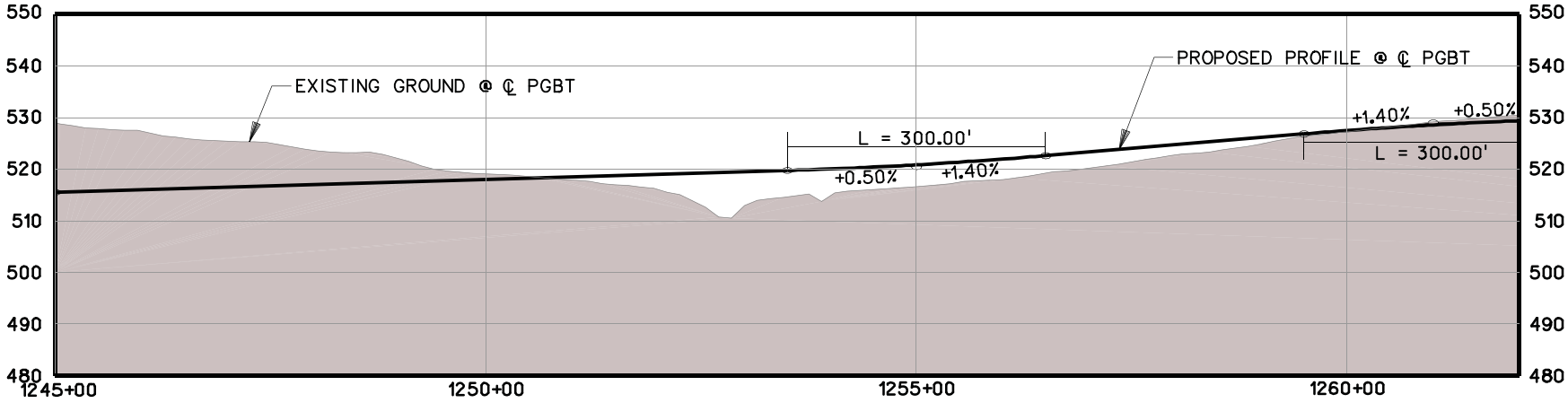

ROW
℄ PGBT
1215+00
1220+00
1225+00
MATCHLINE STA 1228+00
ROW
N
OLD MILES RD
ETC GANTRY

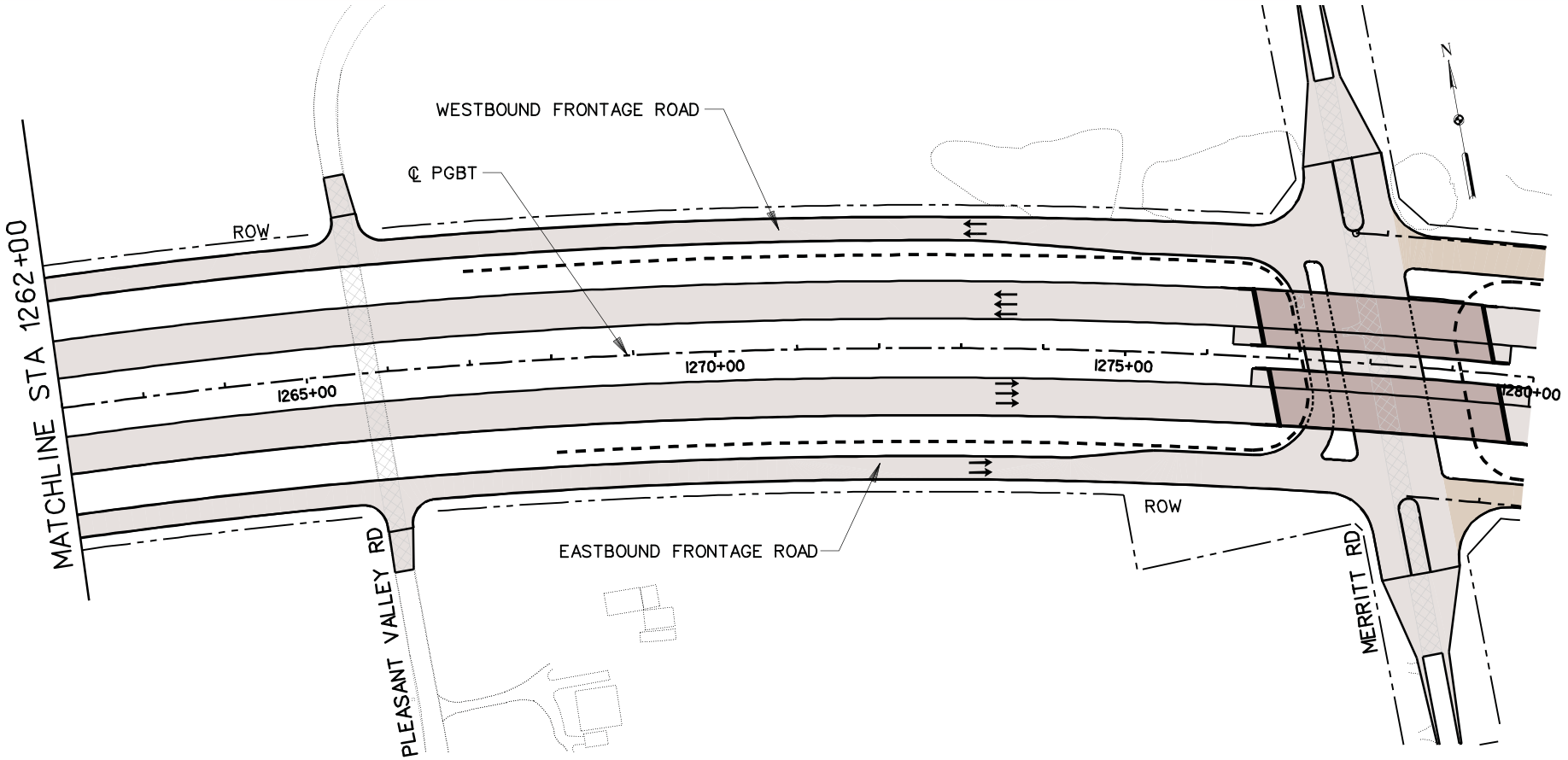

510
500
490
480
470
460
450
440
PROPOSED PROFILE @ ℄ PGBT
EXISTING GROUND @ ℄ PGBT
OLD MILES RD
1215+00
1220+00
1225+00

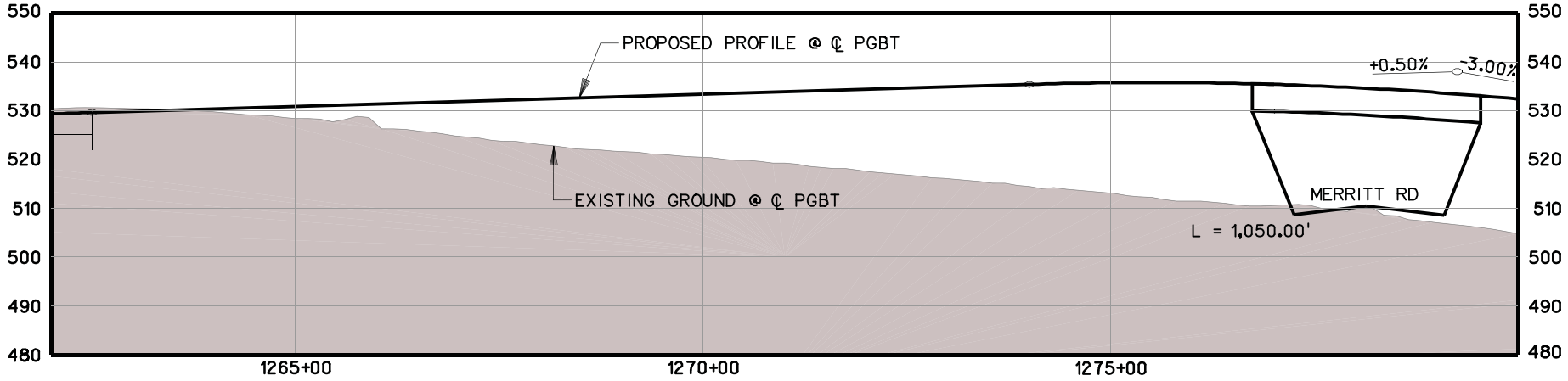

SECTION 28
SECTION 29
ETC GANTRY
ROW
℄ PGBT
WESTBOUND FRONTAGE ROAD
N
MATCHLINE STA 1228+00
1230+00
1235+00
1240+00
1245+00
ROW
EASTBOUND FRONTAGE ROAD
MILES RD
LEGEND
Existing Roadway
Existing Bridge
Pavement Removal
Proposed Roadway (Main Lanes & Frontage Roads)
Proposed Roadway (Ramps & Direct Connectors)
Proposed Bridge
Electronic Toll Collection (ETC) Gantry
Proposed Retaining Wall
Proposed Sound Wall
Traffic Arrow

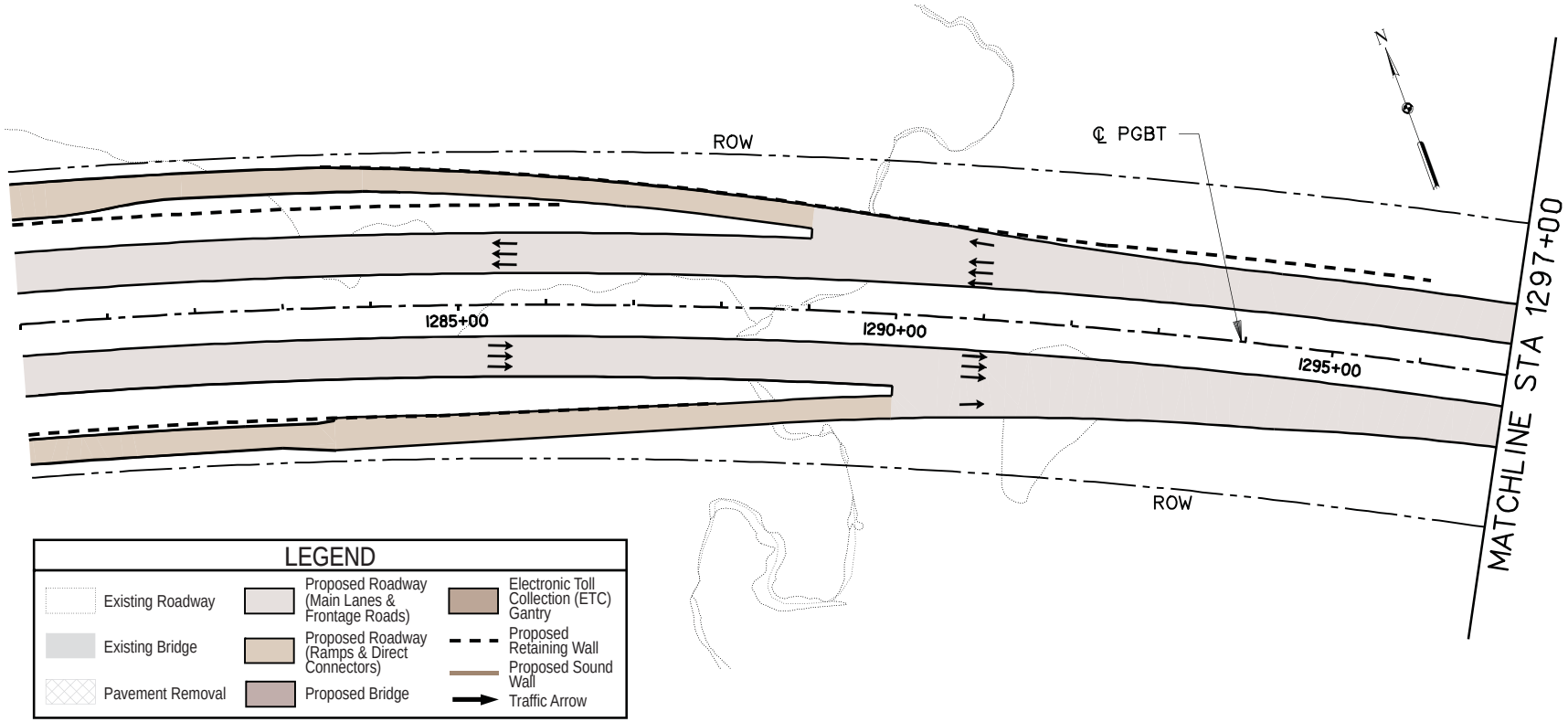

550
540
530
520
510
500
490
480
EXISTING GROUND @ ℄ PGBT
MILES RD
PROPOSED PROFILE @ ℄ PGBT
L = 600.00'
L = 800.00'
+0.50%
+2.50%
+2.50%
+0.50%
1230+00
1235+00
1240+00
1245+00

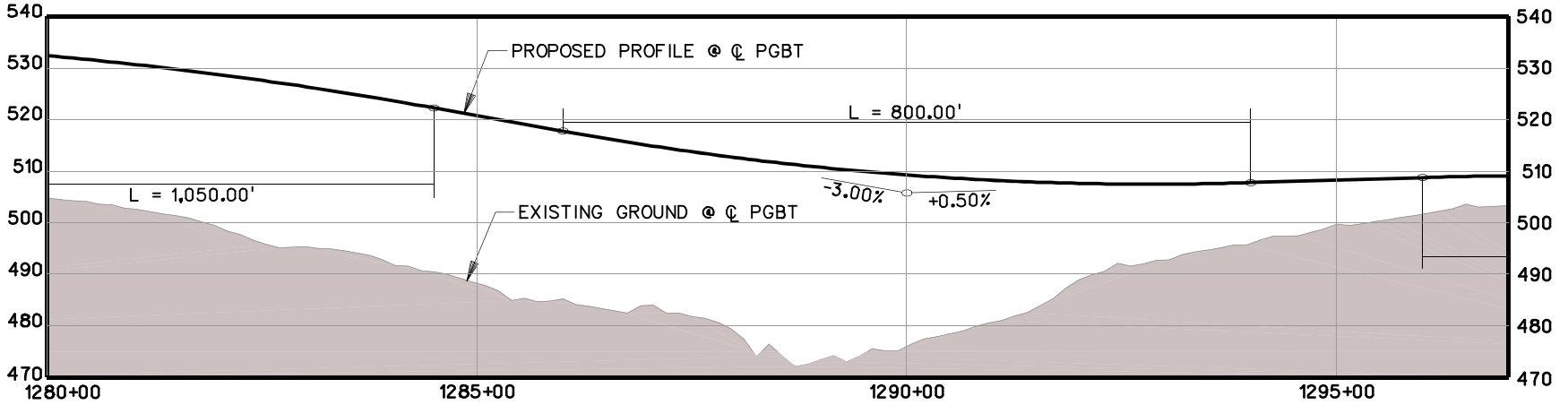

N
WESTBOUND FRONTAGE ROAD
℄ PGBT
ROW
1250+00
1255+00
1260+00
ROW
MATCHLINE STA 1262+00
EASTBOUND FRONTAGE ROAD

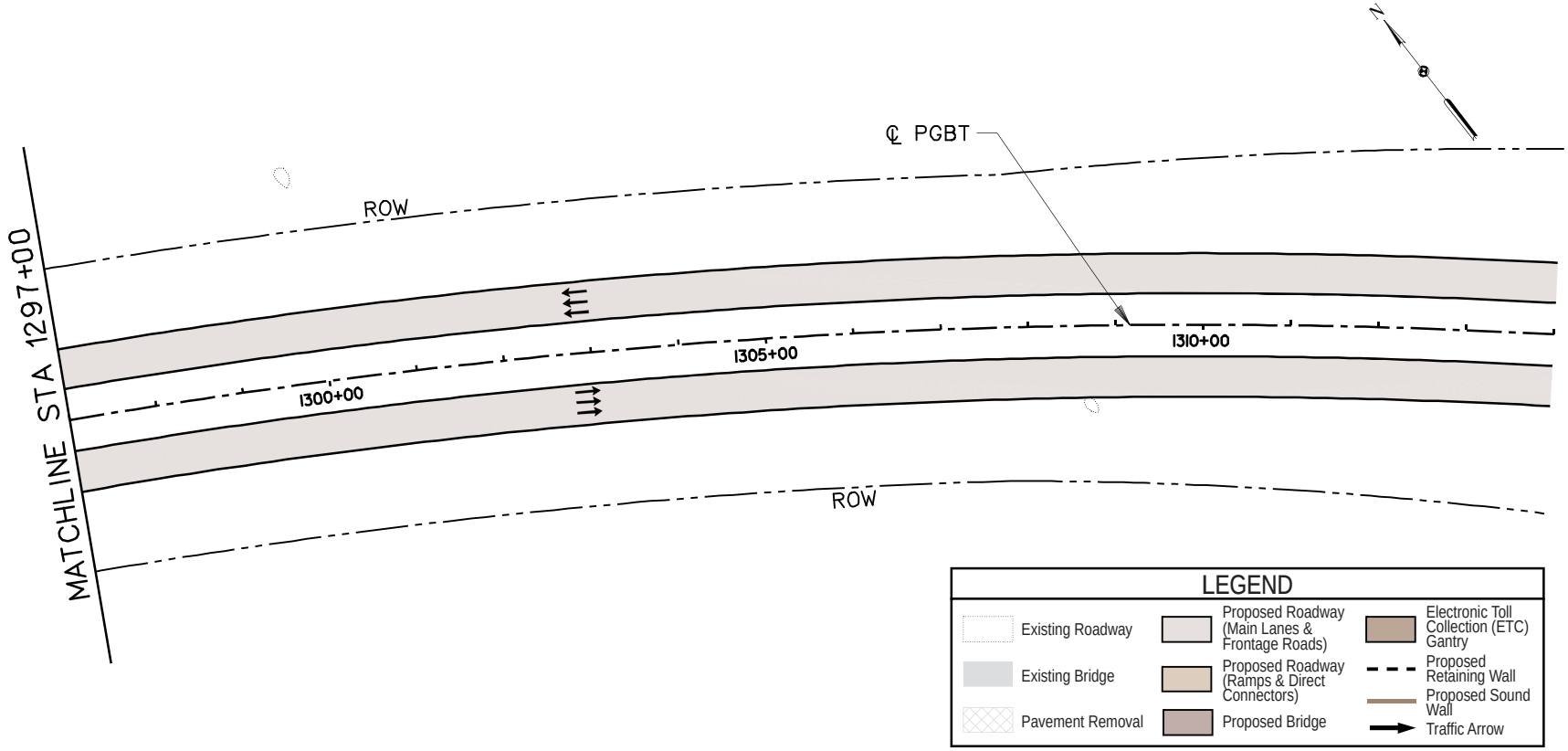

550
540
530
520
510
500
490
480
EXISTING GROUND @ ℄ PGBT
PROPOSED PROFILE @ ℄ PGBT
L = 300.00'
+0.50%
+1.40%
+1.40%
+0.50%
L = 300.00'
1245+00
1250+00
1255+00
1260+00

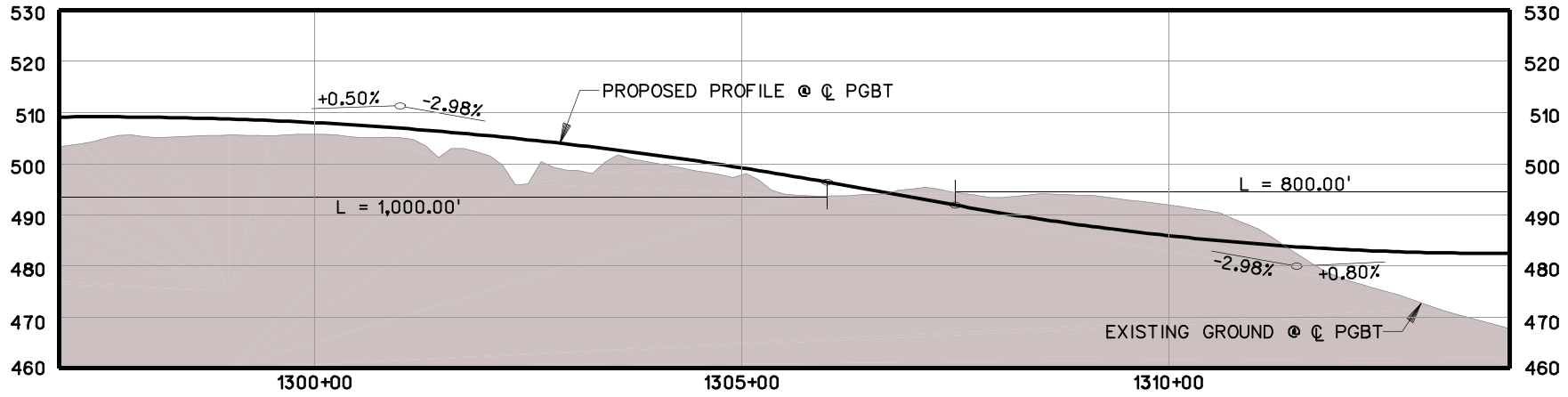

WESTBOUND FRONTAGE ROAD
℄ PGBT
ROW
MATCHLINE STA 1262+00
1265+00
1270+00
1275+00
1280+00
ROW
EASTBOUND FRONTAGE ROAD
PLEASANT VALLEY RD
MERRITT RD
N

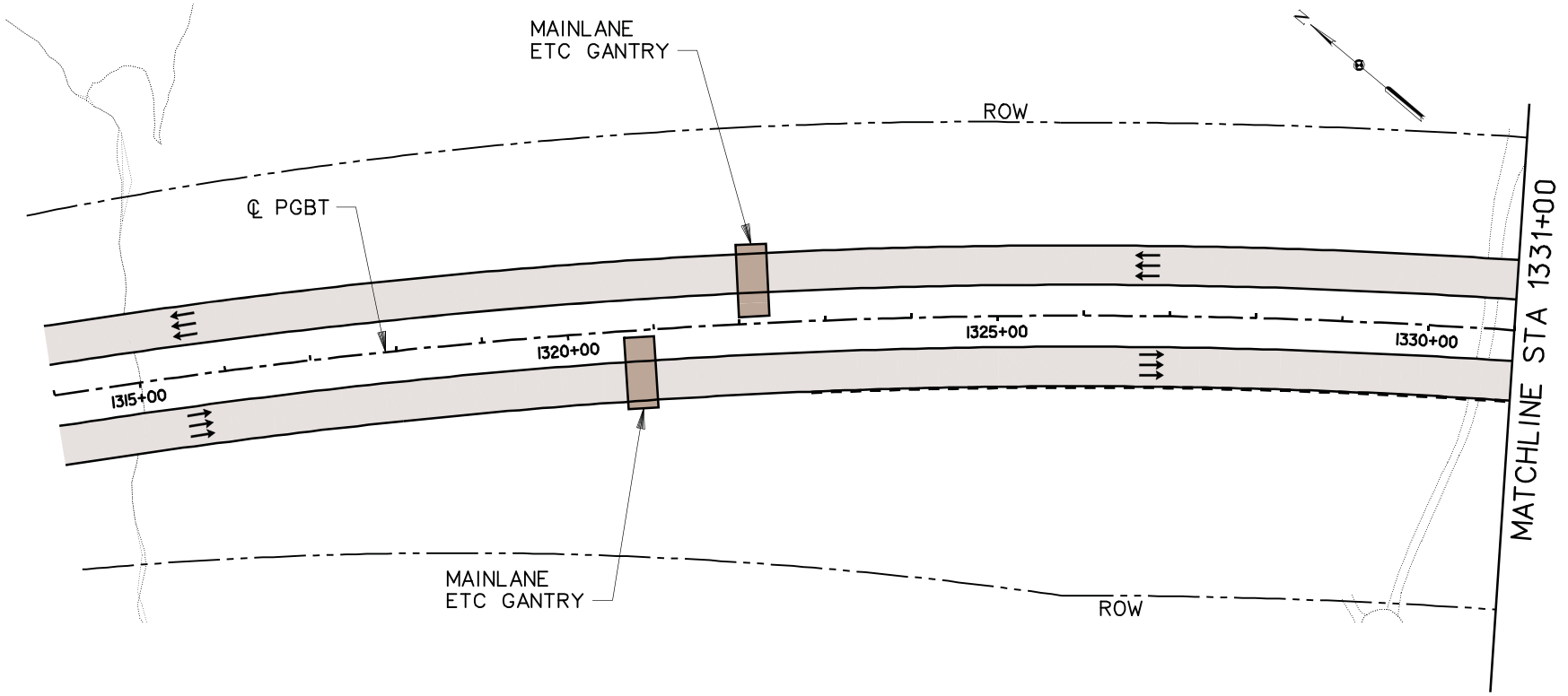

550
540
530
520
510
500
490
480
PROPOSED PROFILE @ ℄ PGBT
+0.50%
-3.00%
EXISTING GROUND @ ℄ PGBT
MERRITT RD
L = 1,050.00'
1265+00
1270+00
1275+00

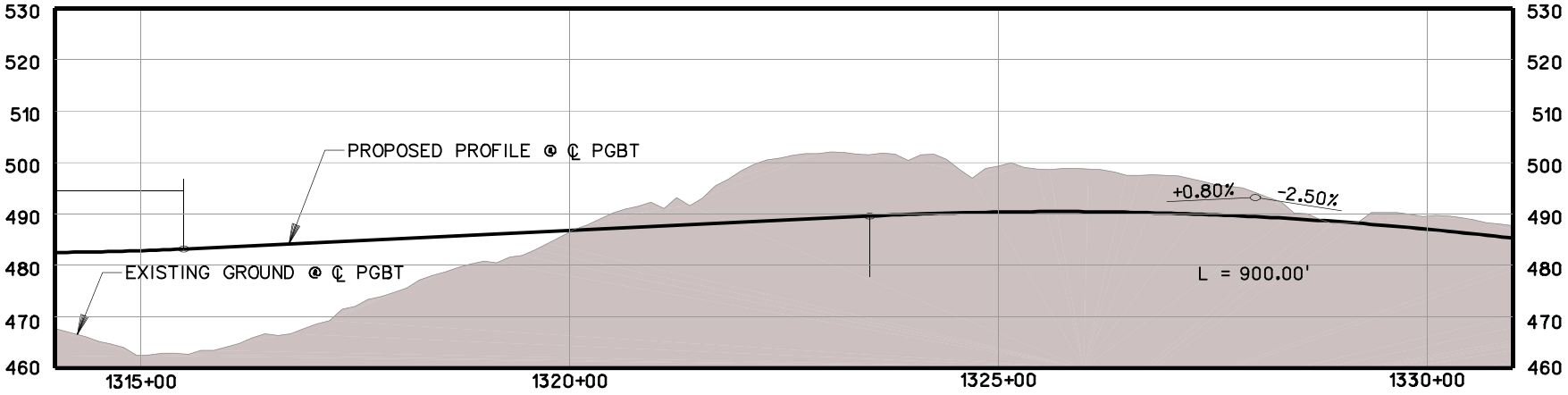

ROW
℄ PGBT
1285+00
1290+00
1295+00
MATCHLINE STA 1297+00
ROW
N
LEGEND
Existing Roadway
Existing Bridge
Pavement Removal
Proposed Roadway (Main Lanes & Frontage Roads)
Proposed Roadway (Ramps & Direct Connectors)
Proposed Bridge
Electronic Toll Collection (ETC) Gantry
Proposed Retaining Wall
Proposed Sound Wall
Traffic Arrow

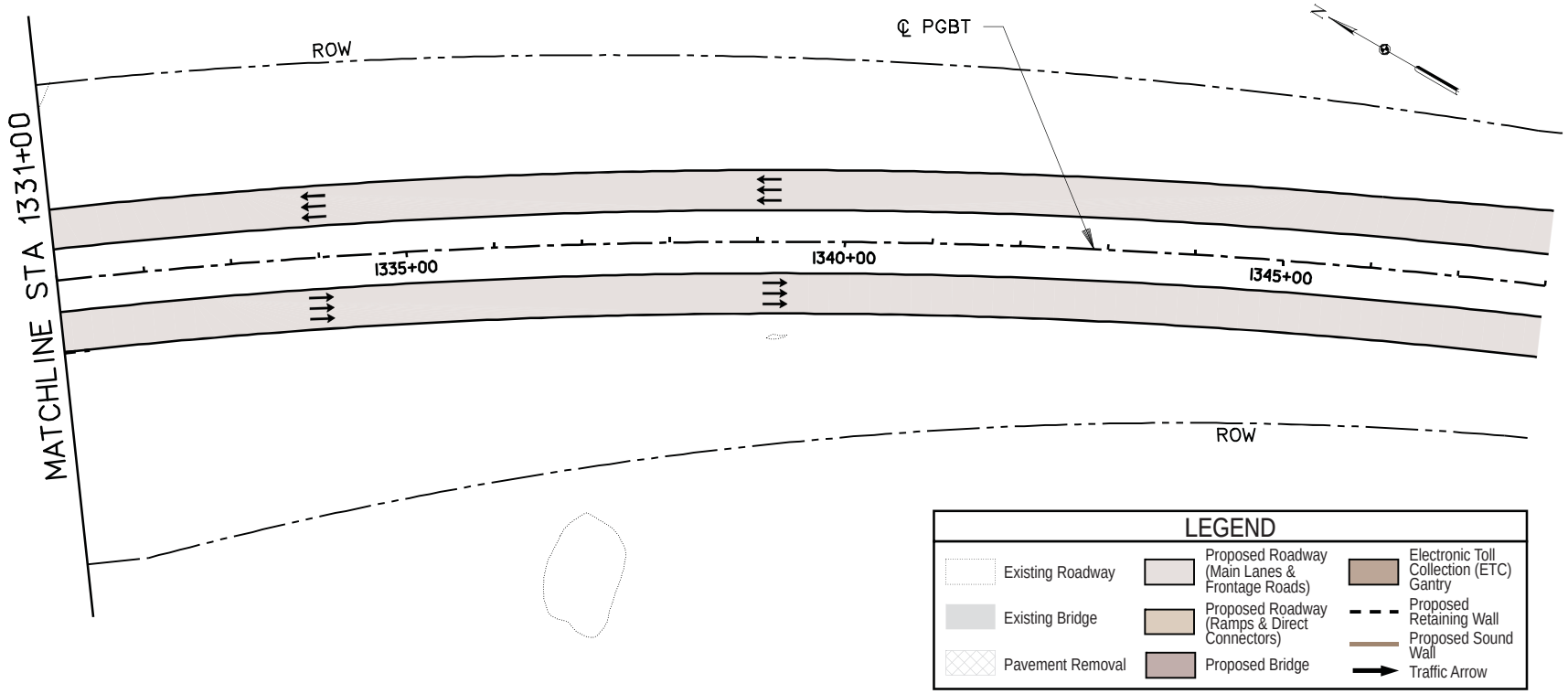

540
530
520
510
500
490
480
470
PROPOSED PROFILE @ ℄ PGBT
L = 800.00'
L = 1,050.00'
-3.00%
+0.50%
EXISTING GROUND @ ℄ PGBT
1280+00
1285+00
1290+00
1295+00

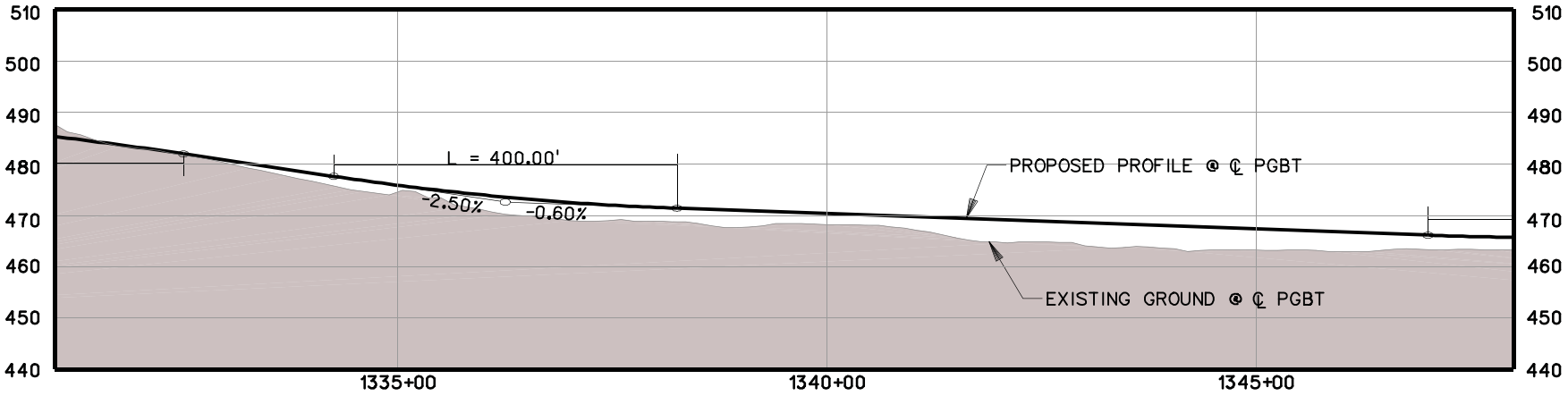

℄ PGBT
ROW
MATCHLINE STA 1297+00
1300+00
1305+00
1310+00
ROW
LEGEND
Existing Roadway
Existing Bridge
Pavement Removal
Proposed Roadway (Main Lanes & Frontage Roads)
Proposed Roadway (Ramps & Direct Connectors)
Proposed Bridge
Electronic Toll Collection (ETC) Gantry
Proposed Retaining Wall
Proposed Sound Wall
Traffic Arrow

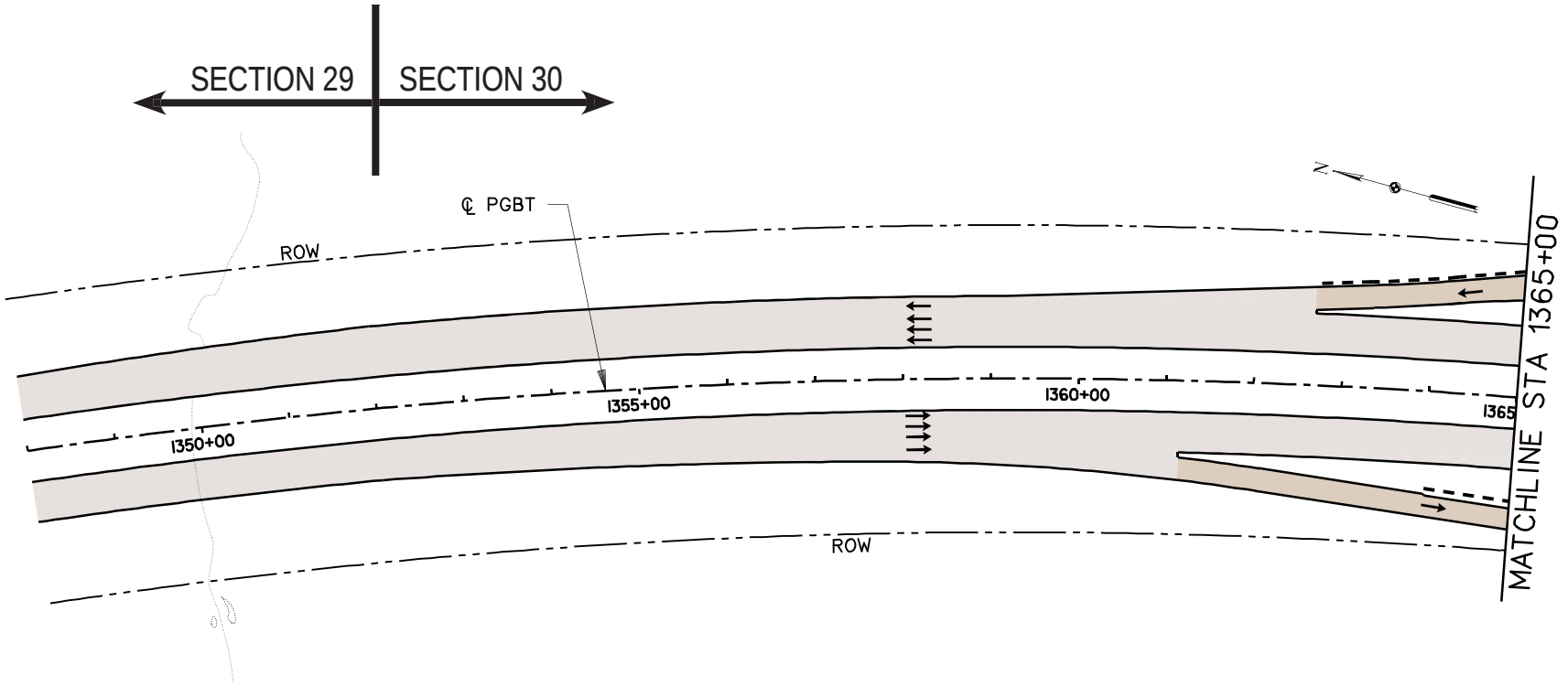

530
520
510
500
490
480
470
460
+0.50%
-2.98%
PROPOSED PROFILE @ ℄ PGBT
L = 1,000.00'
L = 800.00'
-2.98%
+0.80%
EXISTING GROUND @ ℄ PGBT
1300+00
1305+00
1310+00

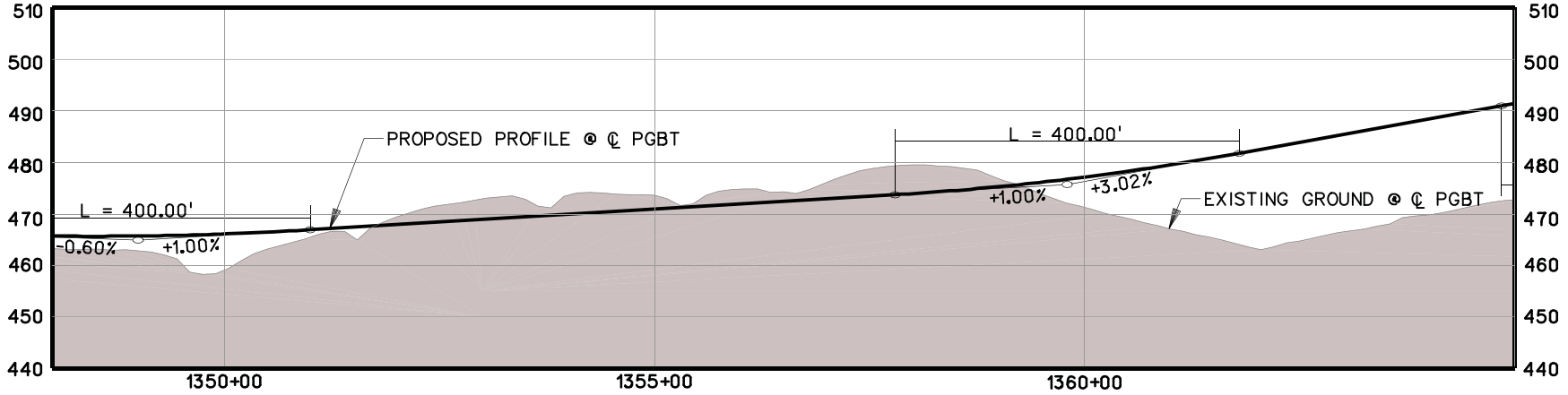

MAINLANE
ETC GANTRY
ROW
℄ PGBT
1315+00
1320+00
1325+00
1330+00
MATCHLINE STA 1331+00
MAINLANE
ETC GANTRY
ROW

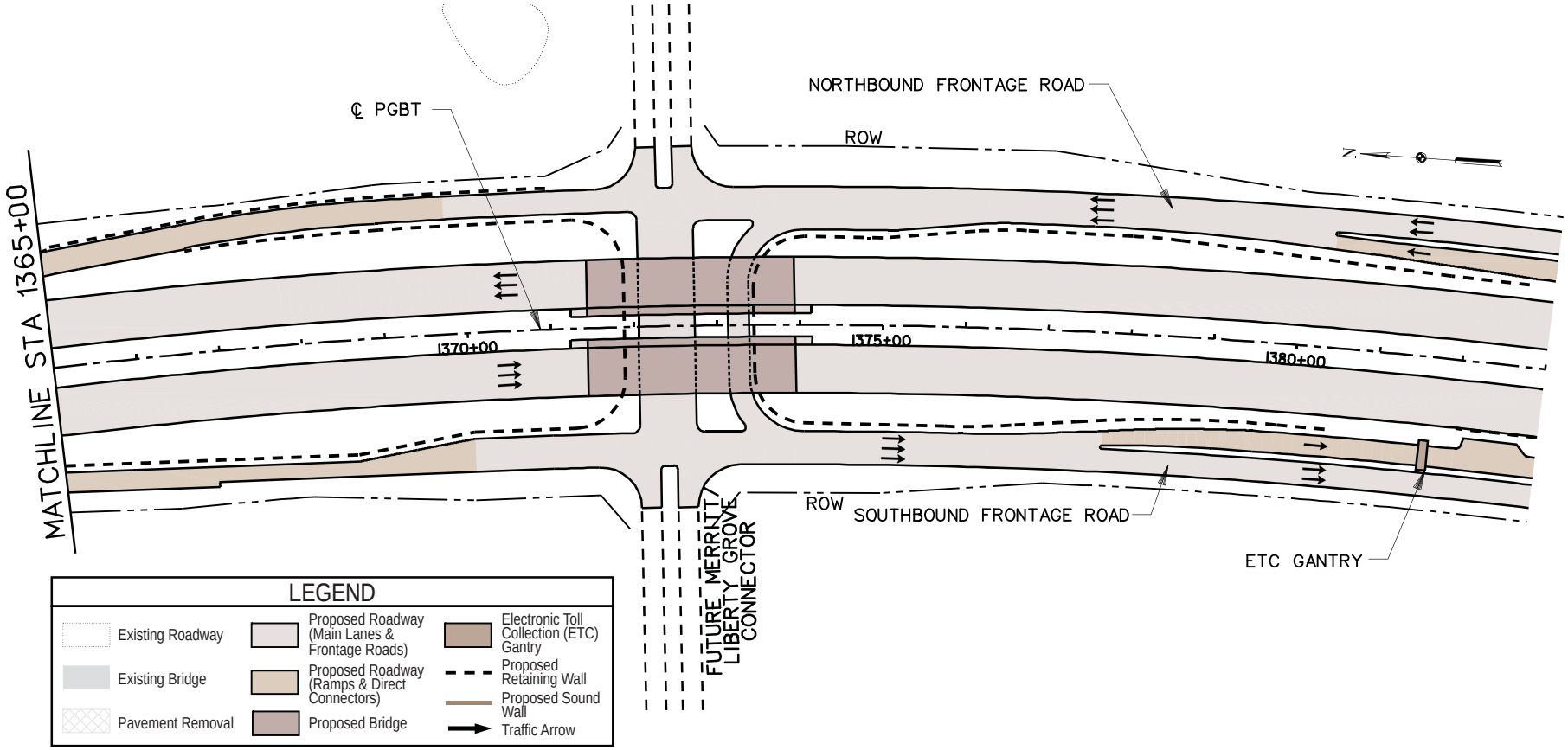

530
520
510
500
490
480
470
460
PROPOSED PROFILE @ ℄ PGBT
EXISTING GROUND @ ℄ PGBT
+0.80%
-2.50%
L = 900.00'
1315+00
1320+00
1325+00
1330+00

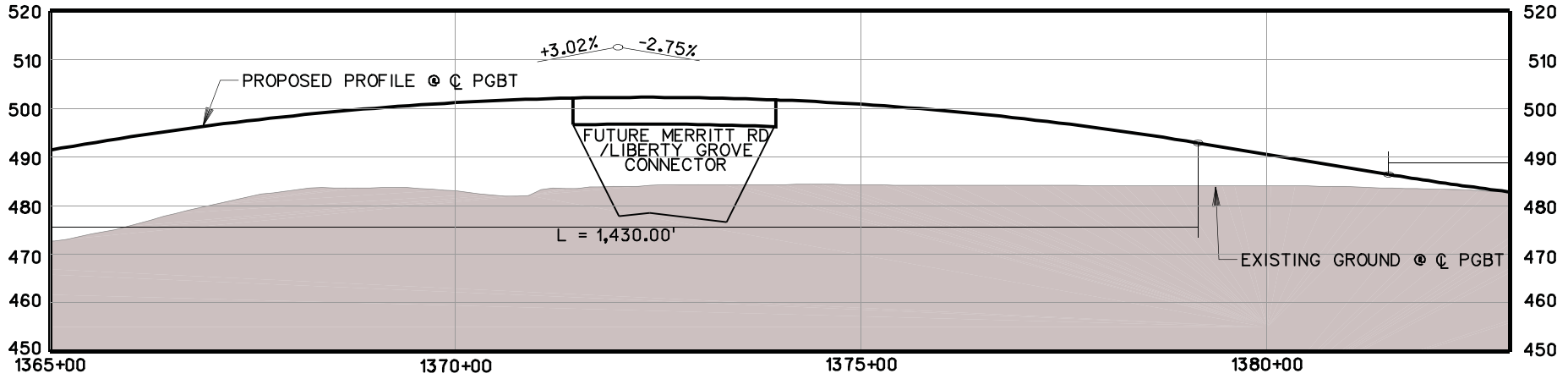

℄ PGBT
ROW
MATCHLINE STA 1331+00
1335+00
1340+00
1345+00
ROW
LEGEND
Existing Roadway
Existing Bridge
Pavement Removal
Proposed Roadway (Main Lanes & Frontage Roads)
Proposed Roadway (Ramps & Direct Connectors)
Proposed Bridge
Electronic Toll Collection (ETC) Gantry
Proposed Retaining Wall
Proposed Sound Wall
Traffic Arrow

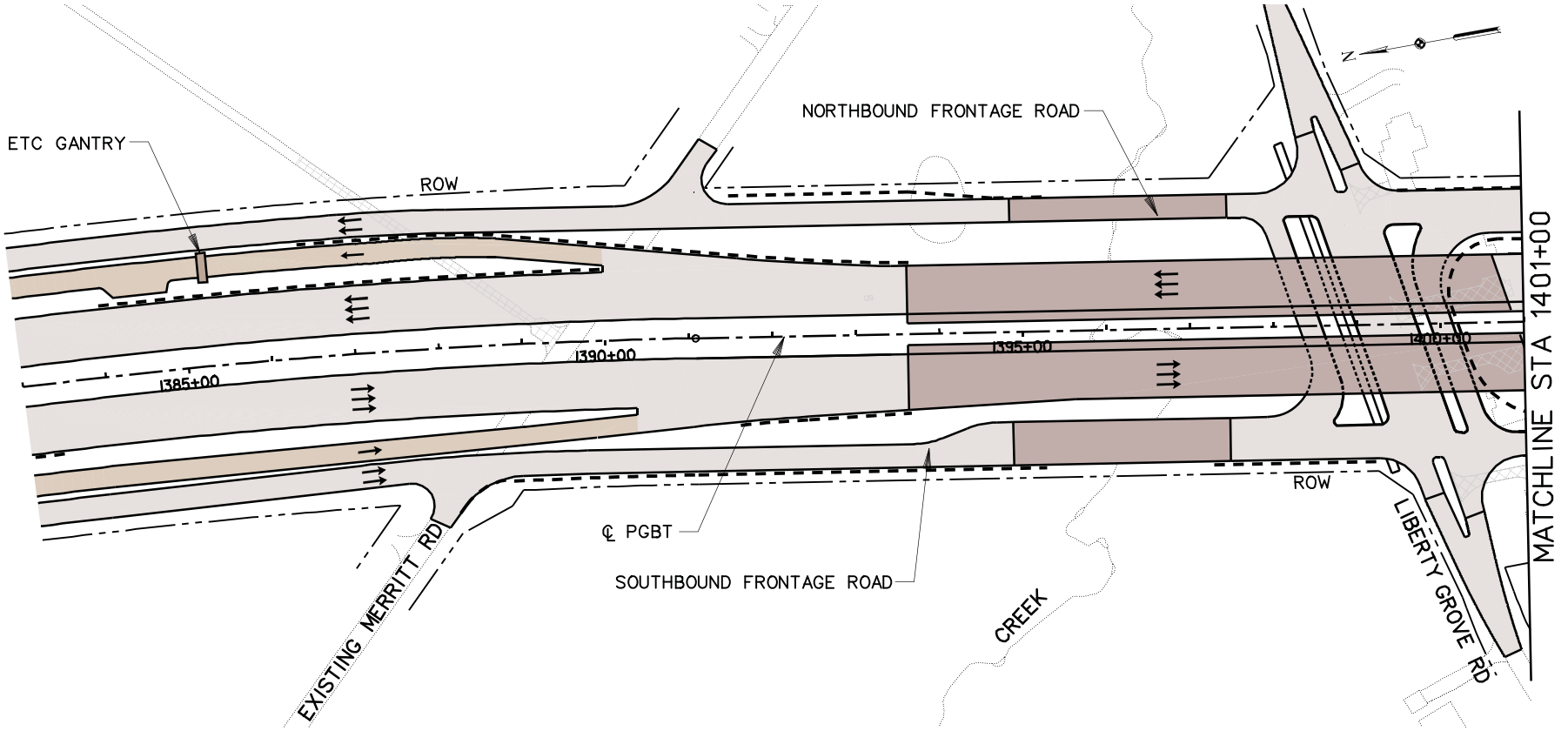

510
500
490
480
470
460
450
440
L = 400.00'
-2.50%
-0.60%
PROPOSED PROFILE @ ℄ PGBT
EXISTING GROUND @ ℄ PGBT
1335+00
1340+00
1345+00

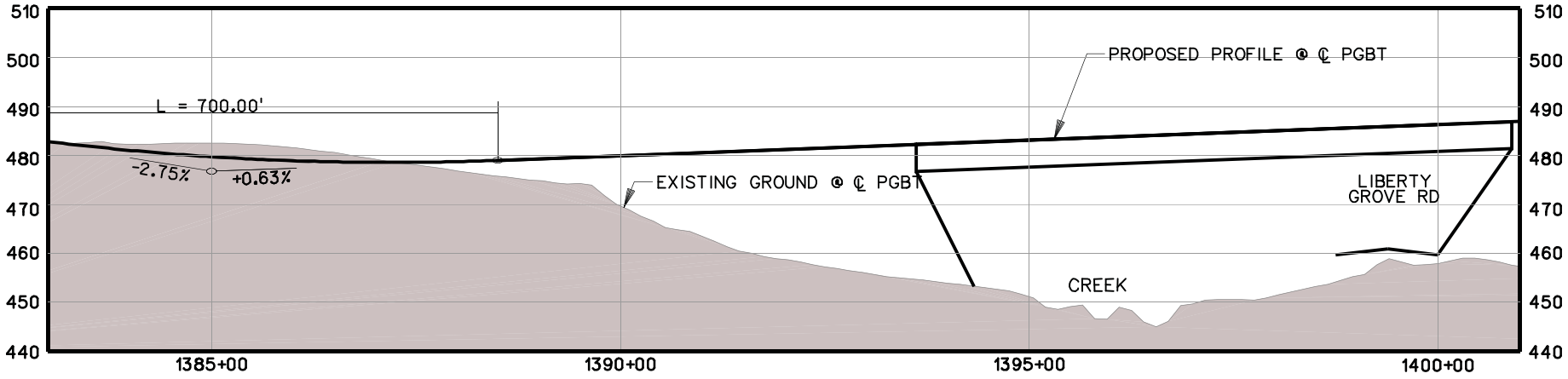

SECTION 29
SECTION 30
℄ PGBT
ROW
1350+00
1355+00
1360+00
1365
MATCHLINE STA 1365+00
ROW

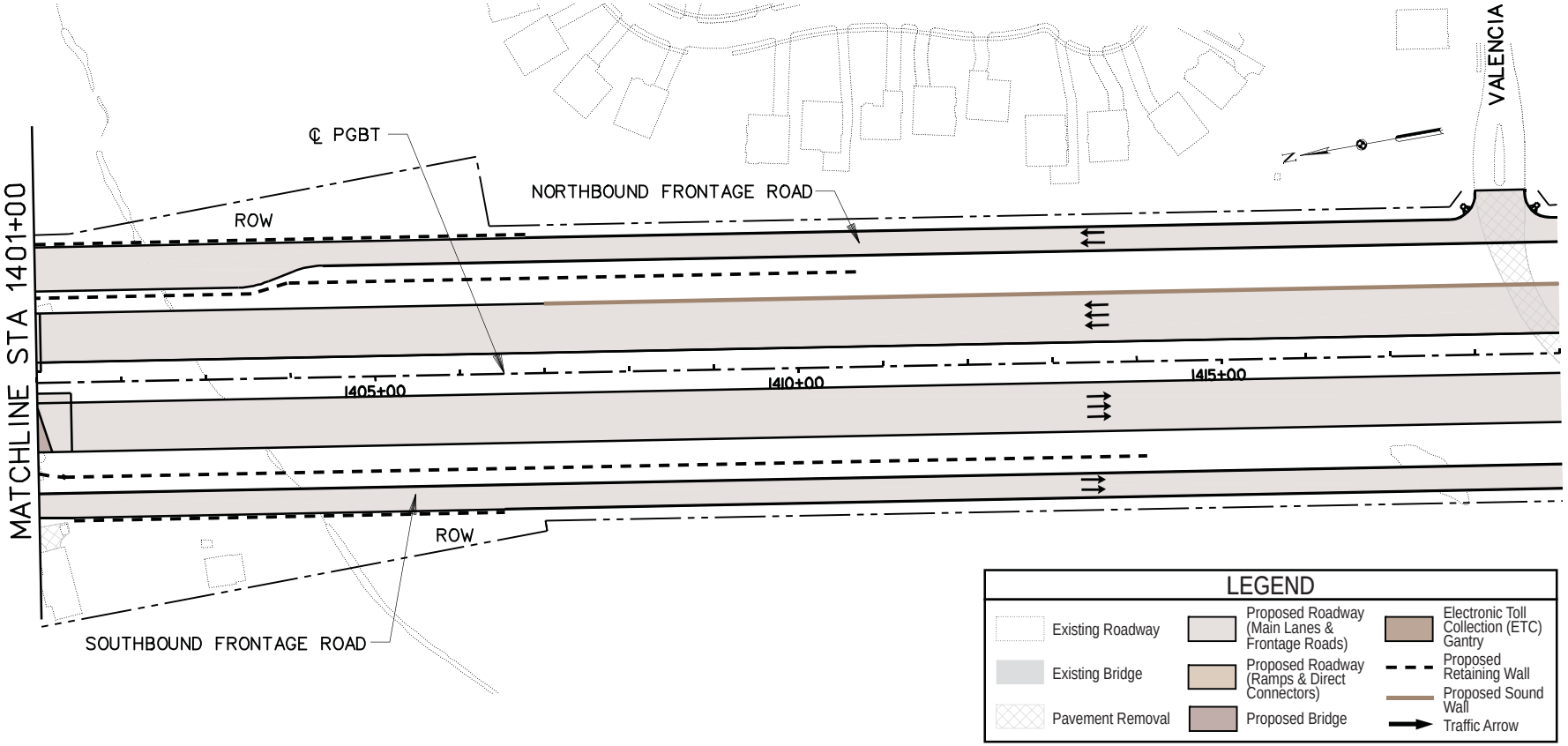

510
500
490
480
470
460
450
440
PROPOSED PROFILE @ ℄ PGBT
L = 400.00'
-0.60%
+1.00%
L = 400.00'
+1.00%
+3.02%
EXISTING GROUND @ ℄ PGBT
1350+00
1355+00
1360+00

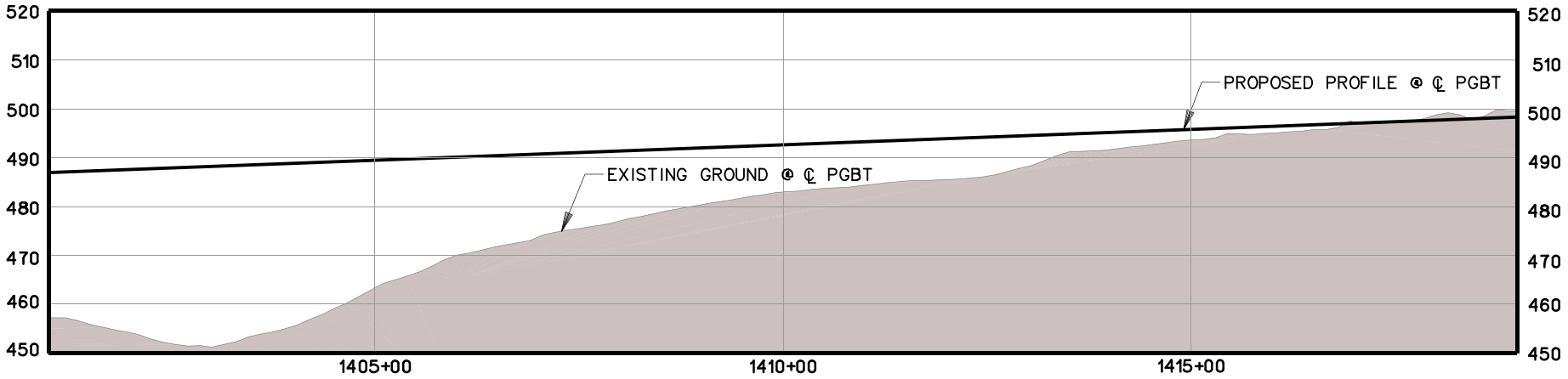

℄ PGBT
NORTHBOUND FRONTAGE ROAD
ROW
MATCHLINE STA 1365+00
1370+00
1375+00
1380+00
ROW
SOUTHBOUND FRONTAGE ROAD
ETC GANTRY
FUTURE MERRITT/ LIBERTY GROVE CONNECTOR
LEGEND
Existing Roadway
Existing Bridge
Pavement Removal
Proposed Roadway (Main Lanes & Frontage Roads)
Proposed Roadway (Ramps & Direct Connectors)
Proposed Bridge
Electronic Toll Collection (ETC) Gantry
Proposed Retaining Wall
Proposed Sound Wall
Traffic Arrow

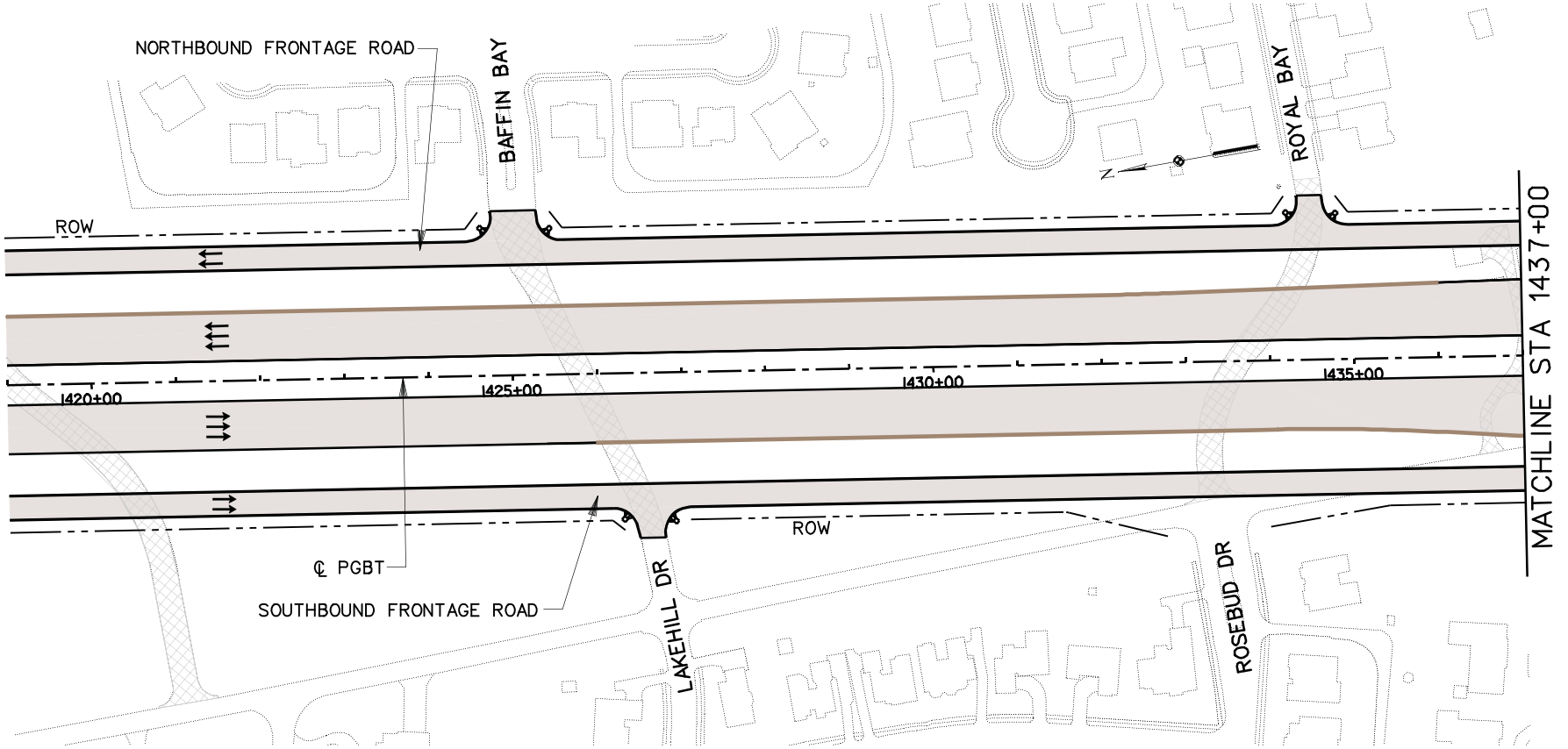

+3.02%
-2.75%
PROPOSED PROFILE @ ℄ PGBT
FUTURE MERRITT RD /LIBERTY GROVE CONNECTOR
L = 1,430.00'
EXISTING GROUND @ ℄ PGBT
520
510
500
490
480
470
460
450
1365+00
1370+00
1375+00
1380+00

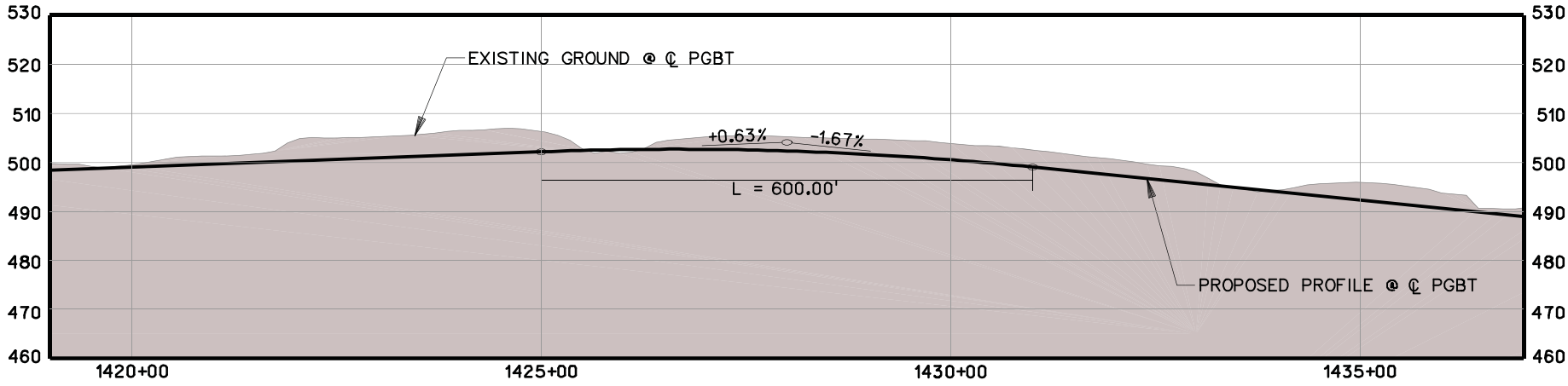

ETC GANTRY
ROW
NORTHBOUND FRONTAGE ROAD
N
1385+00
1390+00
1395+00
1400+00
MATCHLINE STA 1401+00
ROW
℄ PGBT
SOUTHBOUND FRONTAGE ROAD
EXISTING MERRITT RD
CREEK
LIBERTY GROVE RD

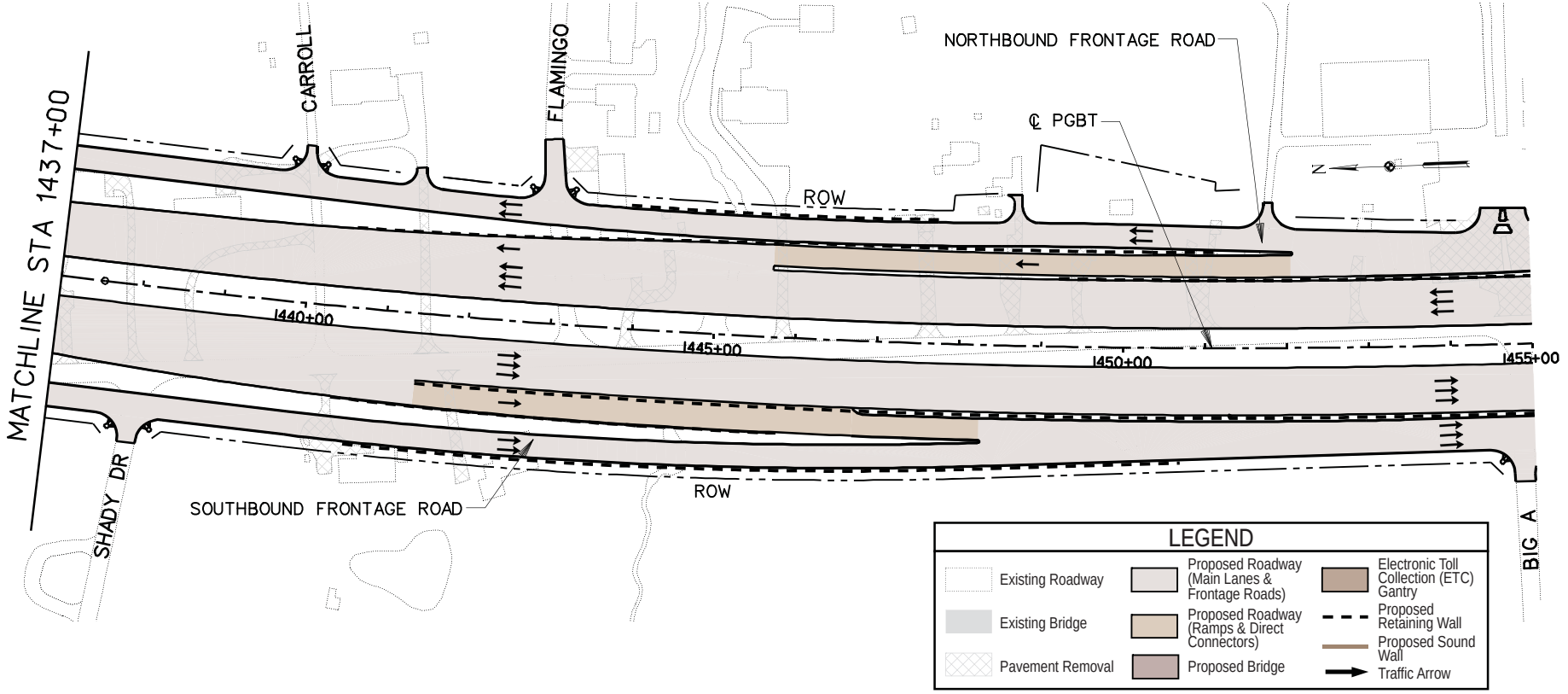

510
500
490
480
470
460
450
440
L = 700.00'
-2.75%
+0.63%
PROPOSED PROFILE @ ℄ PGBT
EXISTING GROUND @ ℄ PGBT
LIBERTY GROVE RD
CREEK
1385+00
1390+00
1395+00
1400+00

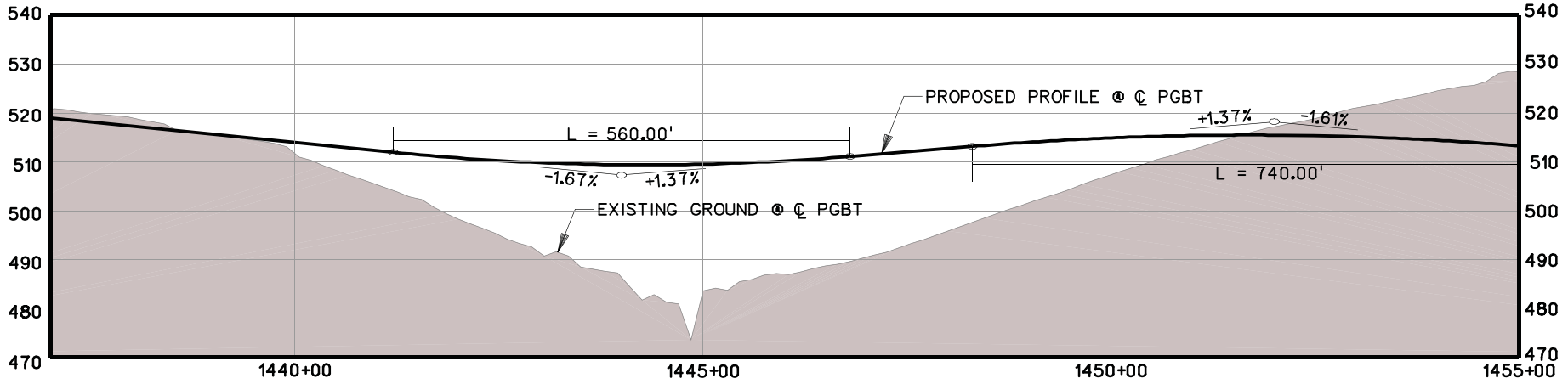

℄ PGBT
NORTHBOUND FRONTAGE ROAD
ROW
VALENCIA
MATCHLINE STA 1401+00
1405+00
1410+00
1415+00
ROW
SOUTHBOUND FRONTAGE ROAD
LEGEND
Existing Roadway
Existing Bridge
Pavement Removal
Proposed Roadway (Main Lanes & Frontage Roads)
Proposed Roadway (Ramps & Direct Connectors)
Proposed Bridge
Electronic Toll Collection (ETC) Gantry
Proposed Retaining Wall
Proposed Sound Wall
Traffic Arrow

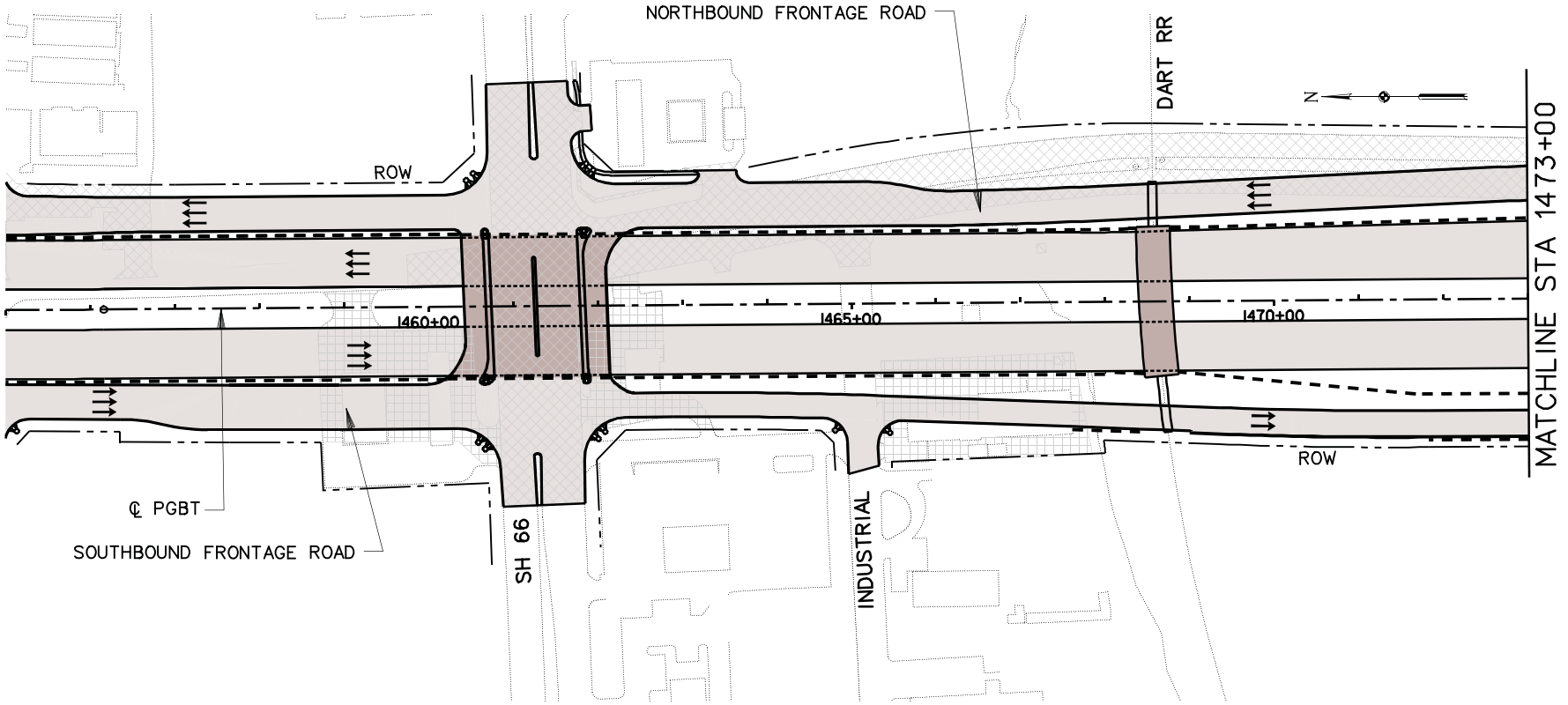

520
510
500
490
480
470
460
450
PROPOSED PROFILE @ ℄ PGBT
EXISTING GROUND @ ℄ PGBT
1405+00
1410+00
1415+00

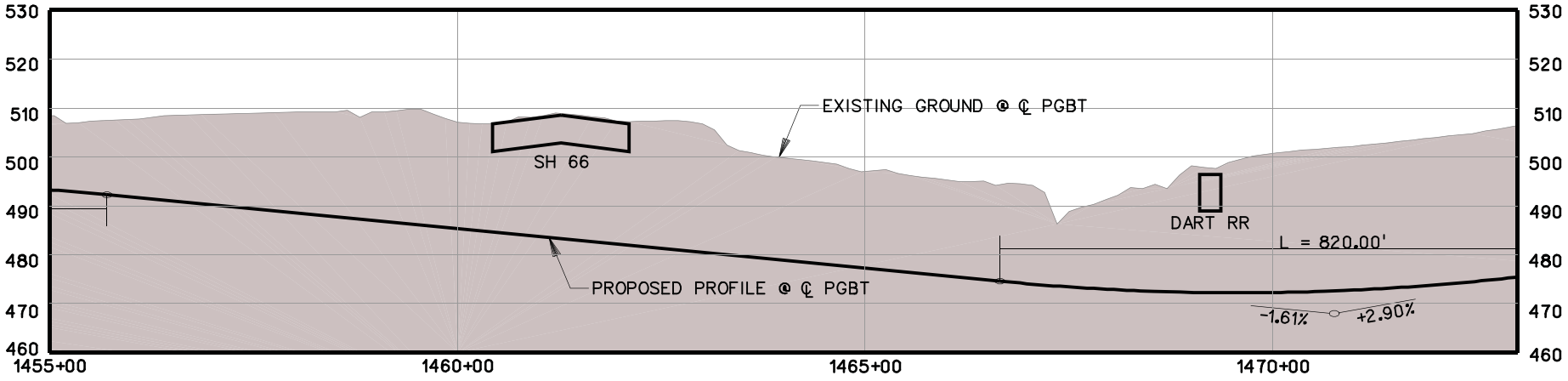

NORTHBOUND FRONTAGE ROAD
BAFFIN BAY
ROYAL BAY
ROW
1420+00
1425+00
1430+00
1435+00
MATCHLINE STA 1437+00
℄ PGBT
SOUTHBOUND FRONTAGE ROAD
LAKEHILL DR
ROW
ROSEBUD DR

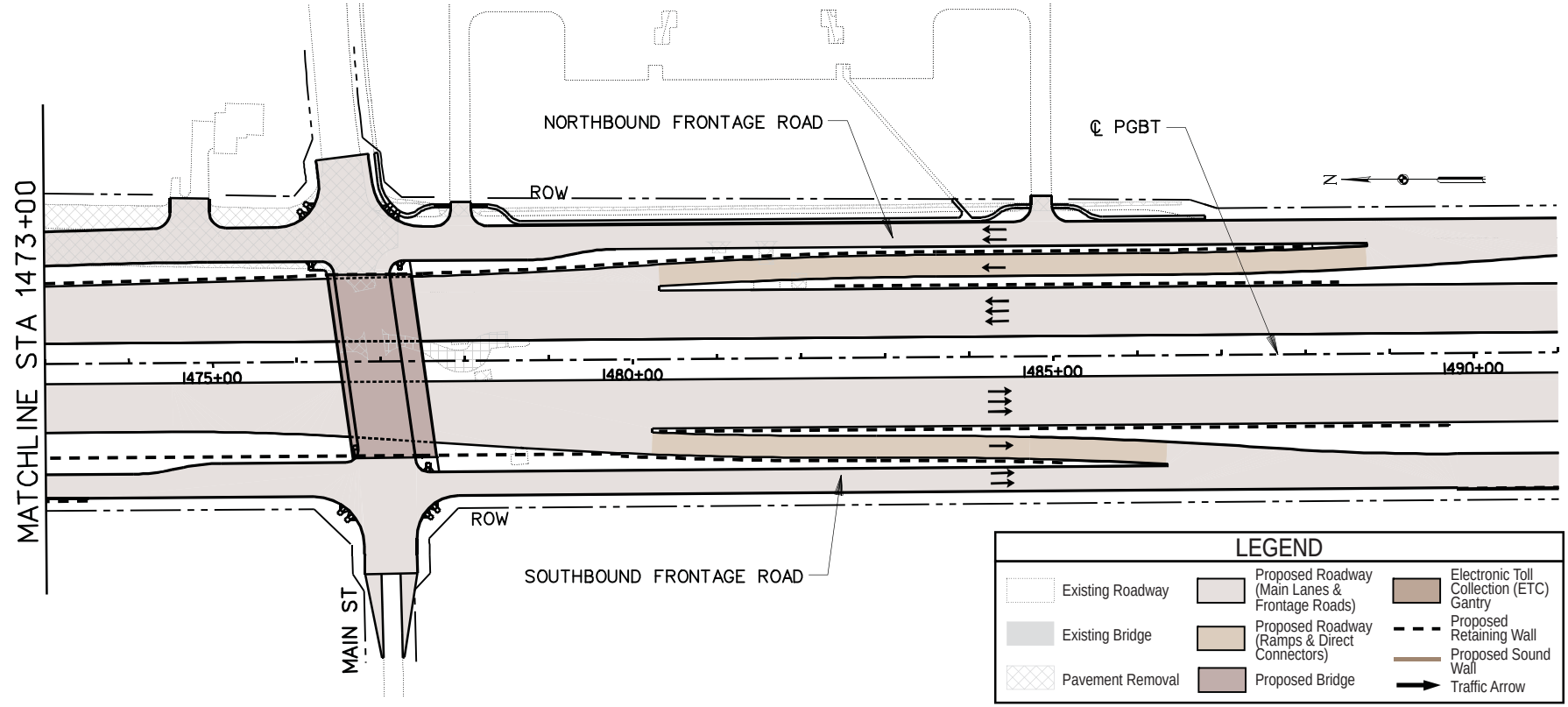

530
520
510
500
490
480
470
460
EXISTING GROUND @ ℄ PGBT
+0.63%
-1.67%
L = 600.00'
PROPOSED PROFILE @ ℄ PGBT
1420+00
1425+00
1430+00
1435+00

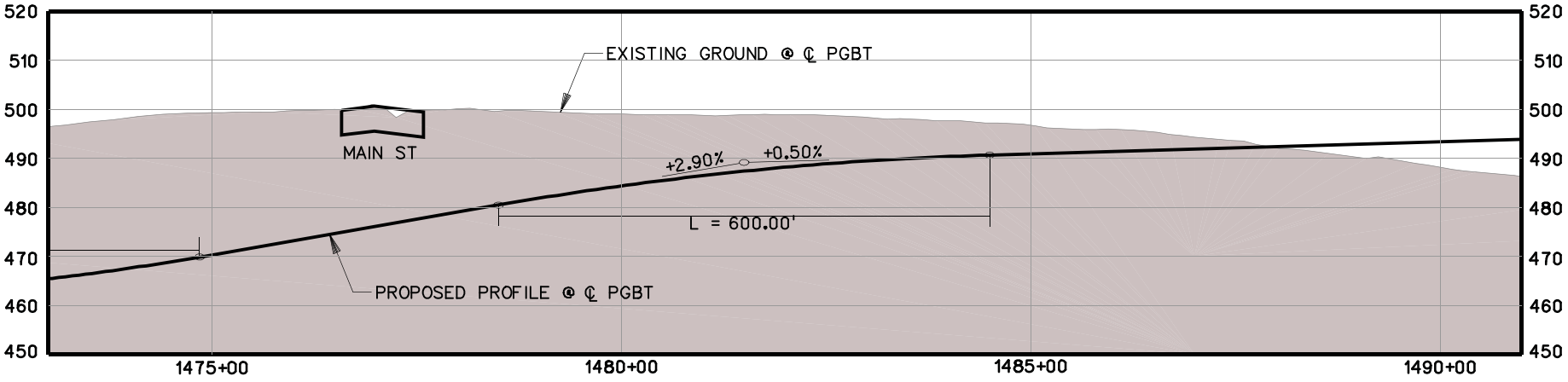

MATCHLINE STA 1437+00
CARROLL
FLAMINGO
NORTHBOUND FRONTAGE ROAD
℄ PGBT
ROW
1440+00
1445+00
1450+00
1455+00
SHADY DR
SOUTHBOUND FRONTAGE ROAD
ROW
BIG A
LEGEND
Existing Roadway
Existing Bridge
Pavement Removal
Proposed Roadway (Main Lanes & Frontage Roads)
Proposed Roadway (Ramps & Direct Connectors)
Proposed Bridge
Electronic Toll Collection (ETC) Gantry
Proposed Retaining Wall
Proposed Sound Wall
Traffic Arrow

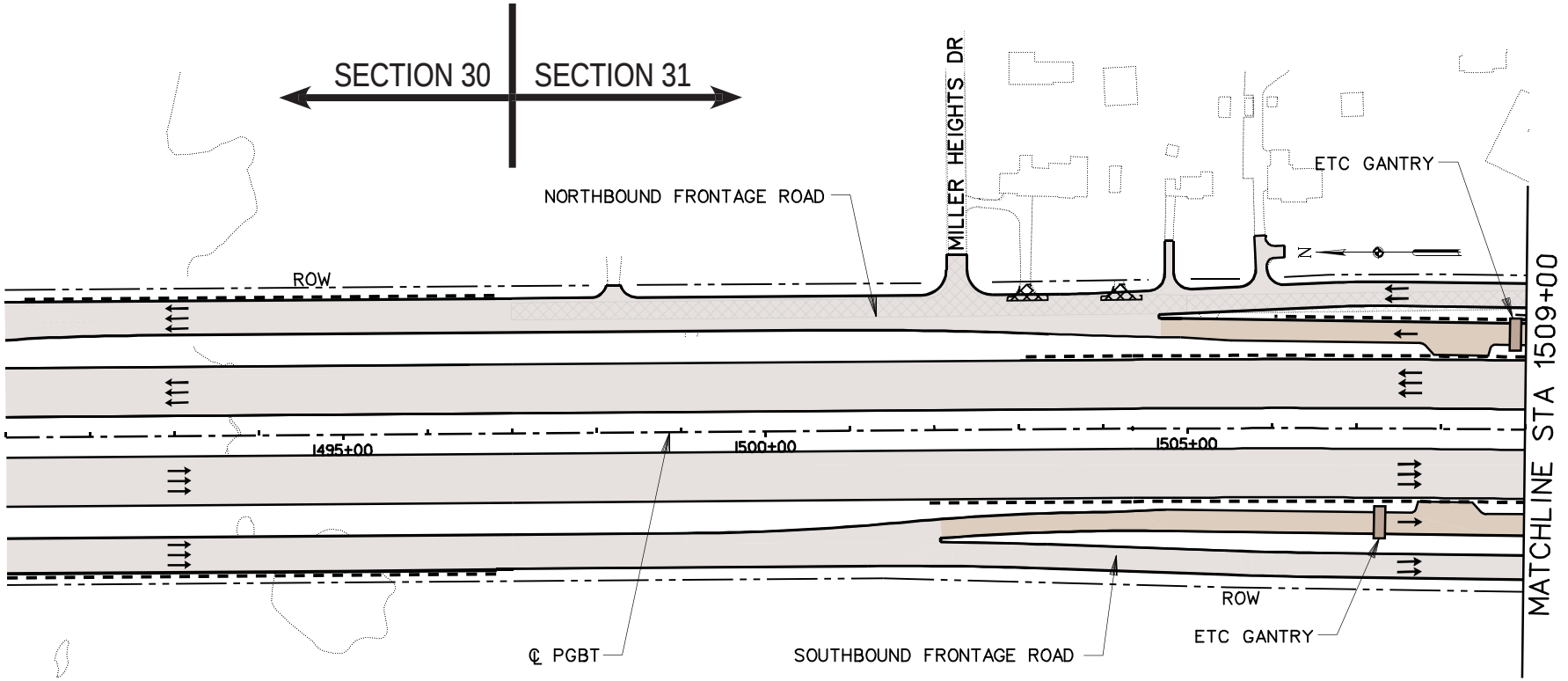

540
530
520
510
500
490
480
470
PROPOSED PROFILE @ ℄ PGBT
L = 560.00'
-1.67%
+1.37%
+1.37%
-1.61%
L = 740.00'
EXISTING GROUND @ ℄ PGBT
1440+00
1445+00
1450+00
1455+00

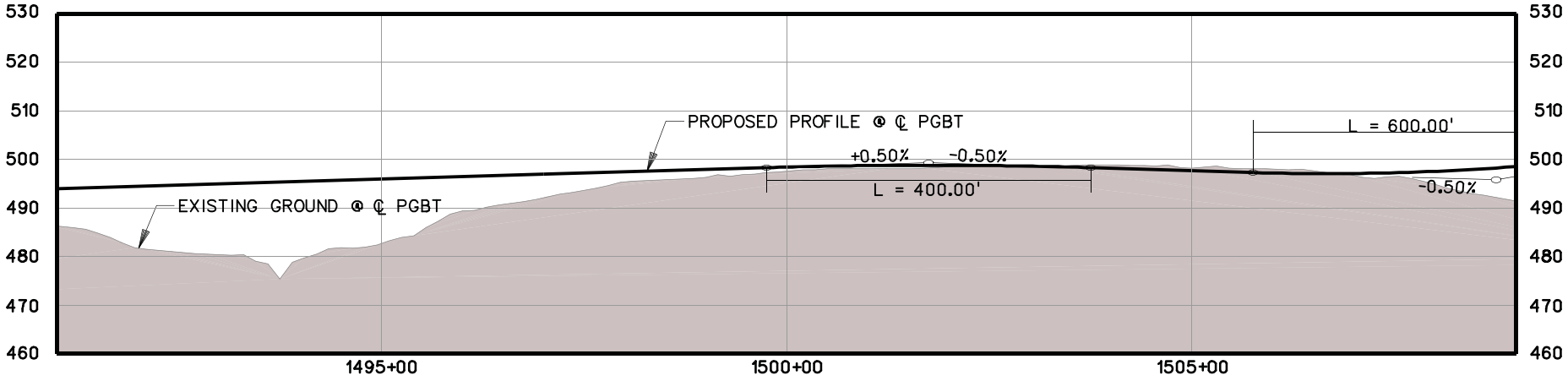

NORTHBOUND FRONTAGE ROAD
DART RR
N
ROW
1460+00
1465+00
1470+00
MATCHLINE STA 1473+00
ROW
℄ PGBT
SOUTHBOUND FRONTAGE ROAD
SH 66
INDUSTRIAL

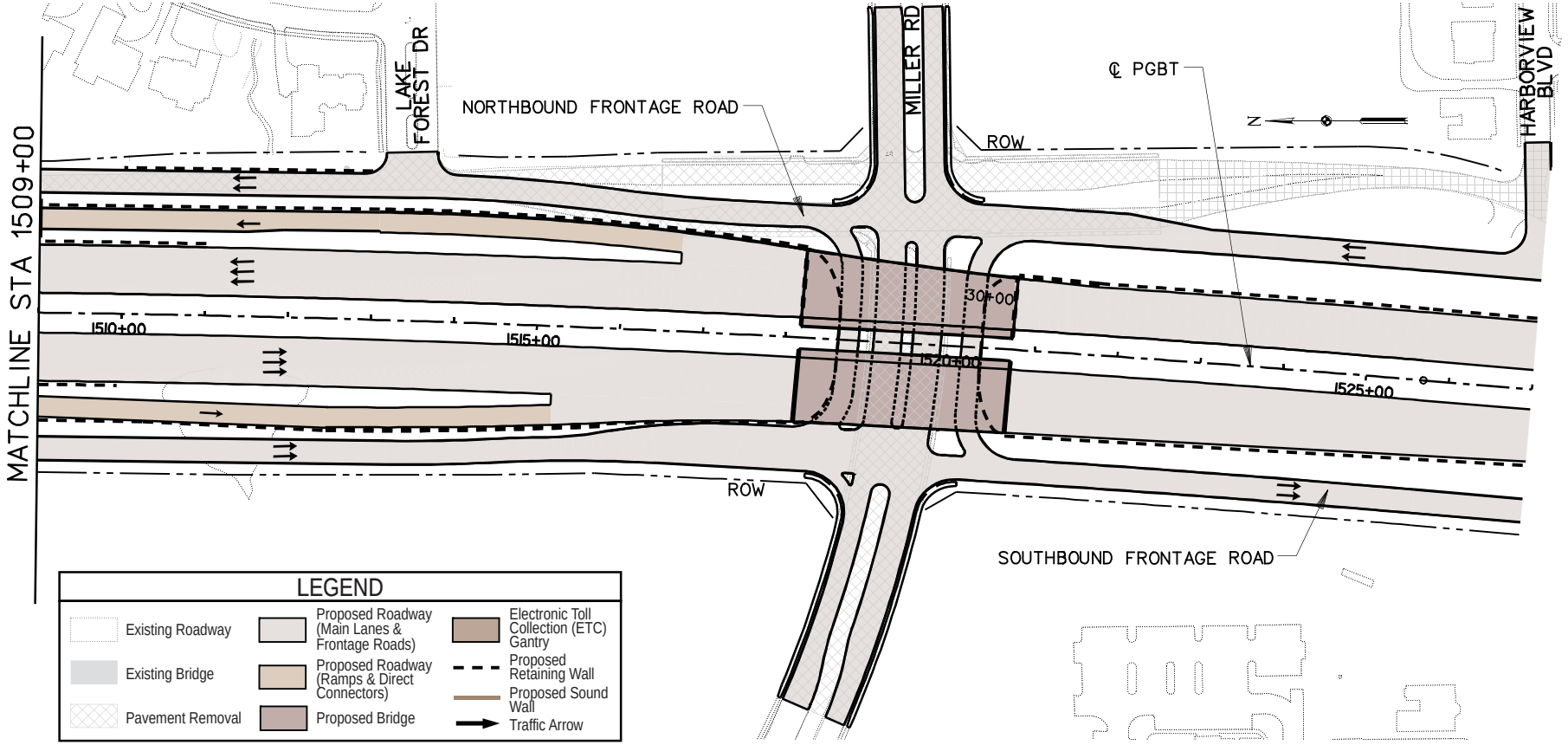

530
520
510
500
490
480
470
460
EXISTING GROUND @ ℄ PGBT
SH 66
DART RR
L = 820.00'
PROPOSED PROFILE @ ℄ PGBT
-1.61%
+2.90%
1455+00
1460+00
1465+00
1470+00

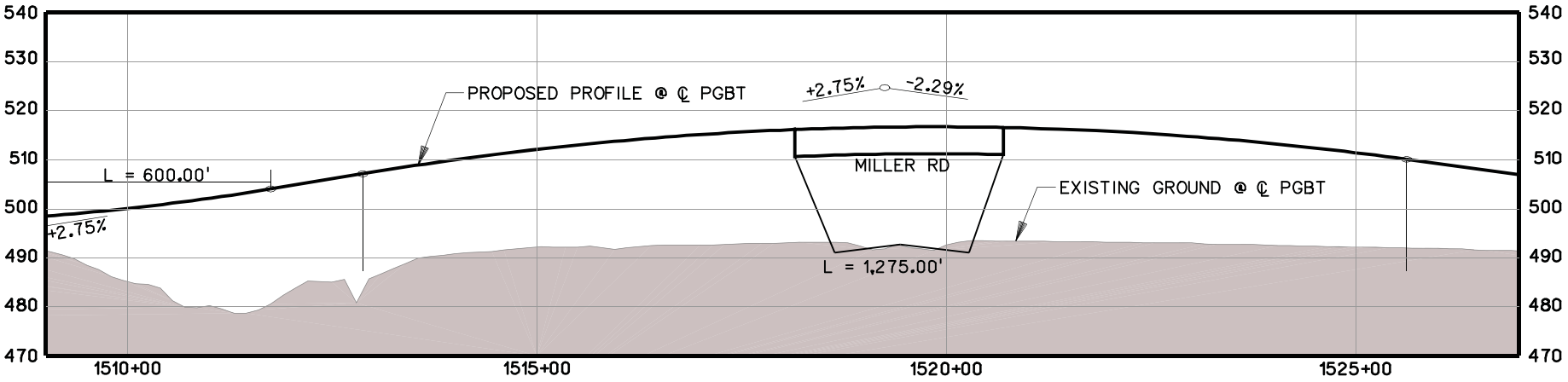

NORTHBOUND FRONTAGE ROAD
℄ PGBT
ROW
MATCHLINE STA 1473+00
1475+00
1480+00
1485+00
1490+00
ROW
SOUTHBOUND FRONTAGE ROAD
MAIN ST
LEGEND
Existing Roadway
Existing Bridge
Pavement Removal
Proposed Roadway (Main Lanes & Frontage Roads)
Proposed Roadway (Ramps & Direct Connectors)
Proposed Bridge
Electronic Toll Collection (ETC) Gantry
Proposed Retaining Wall
Proposed Sound Wall
Traffic Arrow

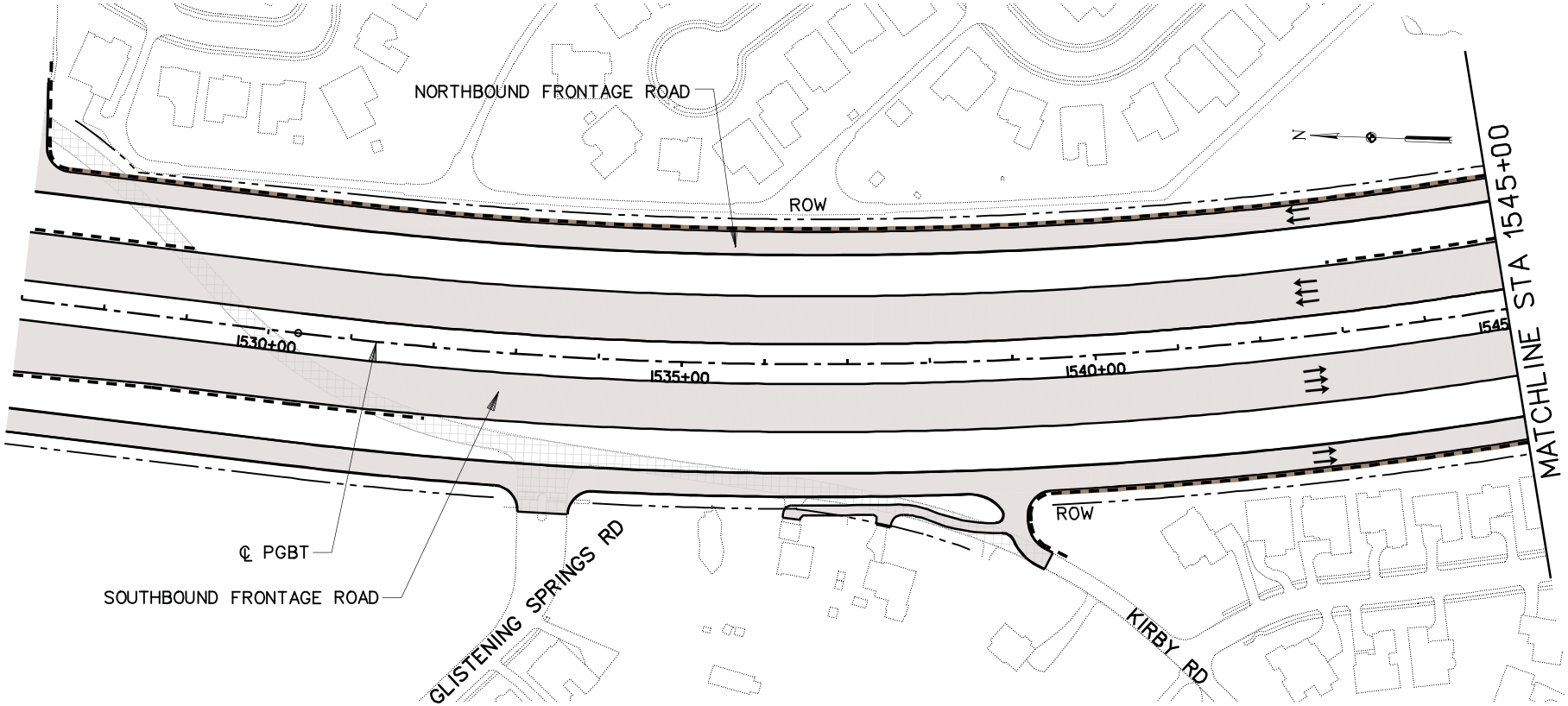

520
510
500
490
480
470
460
450
EXISTING GROUND @ ℄ PGBT
MAIN ST
+2.90%
+0.50%
L = 600.00'
PROPOSED PROFILE @ ℄ PGBT
1475+00
1480+00
1485+00
1490+00

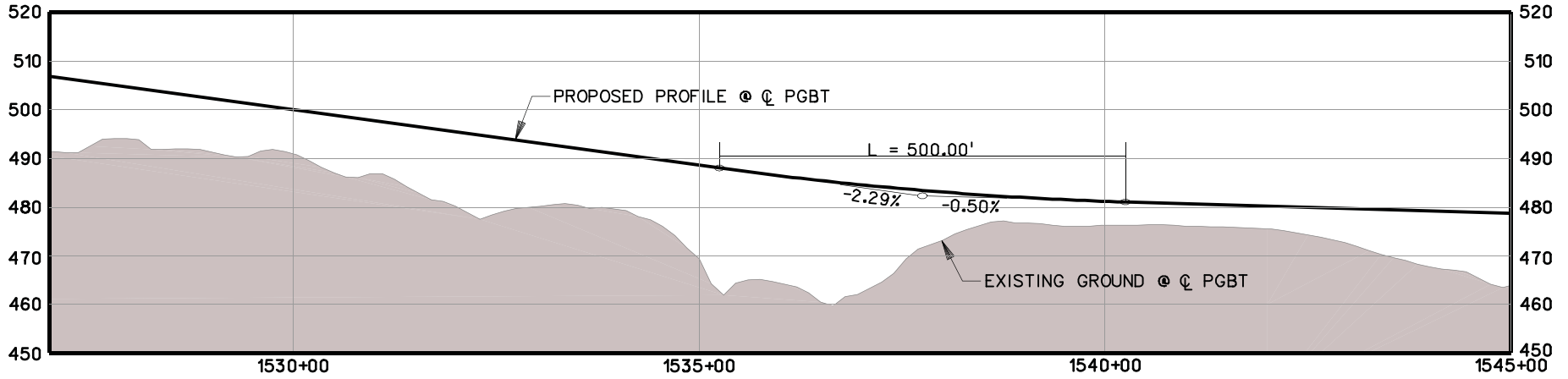

SECTION 30
SECTION 31
MILLER HEIGHTS DR
NORTHBOUND FRONTAGE ROAD
ETC GANTRY
N
ROW
1495+00
1500+00
1505+00
MATCHLINE STA 1509+00
℄ PGBT
SOUTHBOUND FRONTAGE ROAD
ROW
ETC GANTRY

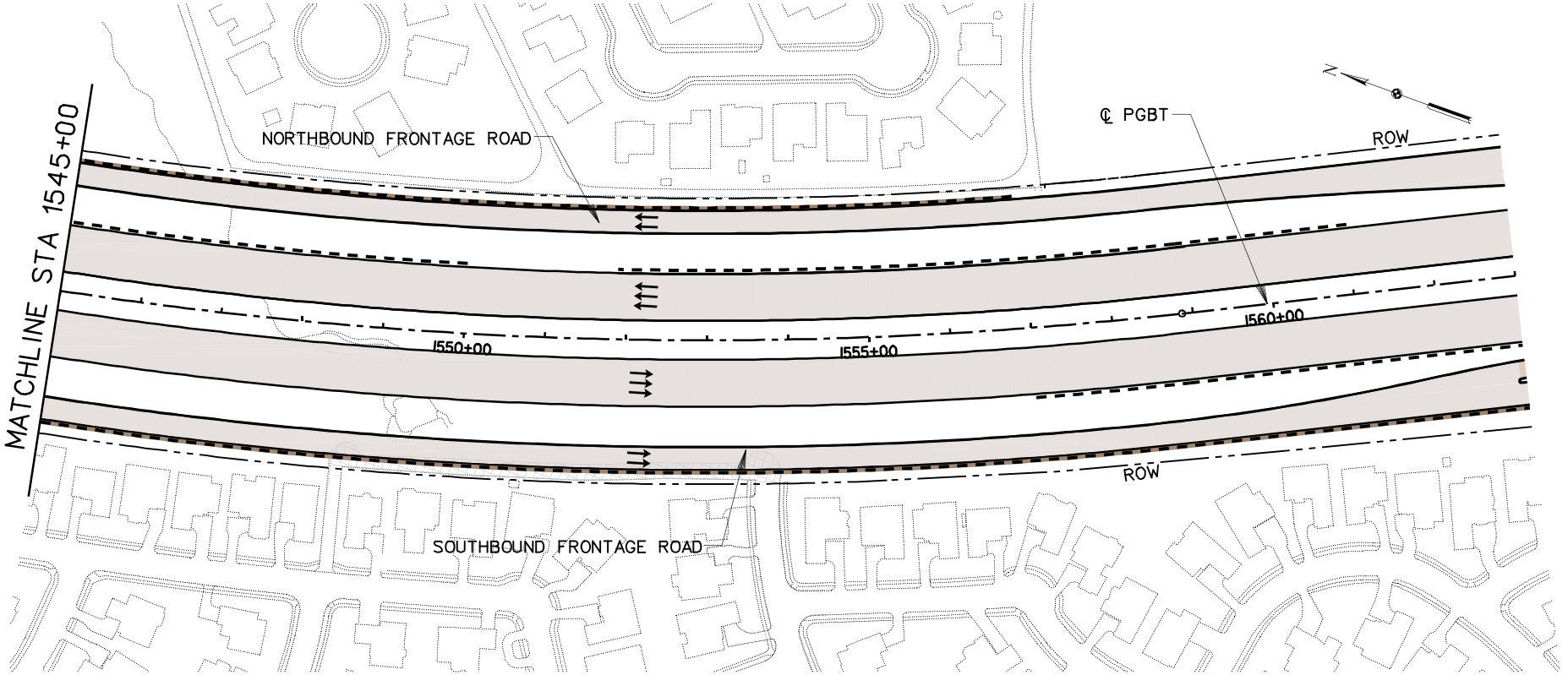

530
520
510
500
490
480
470
460
PROPOSED PROFILE @ ℄ PGBT
+0.50%
-0.50%
L = 400.00'
L = 600.00'
-0.50%
EXISTING GROUND @ ℄ PGBT
1495+00
1500+00
1505+00

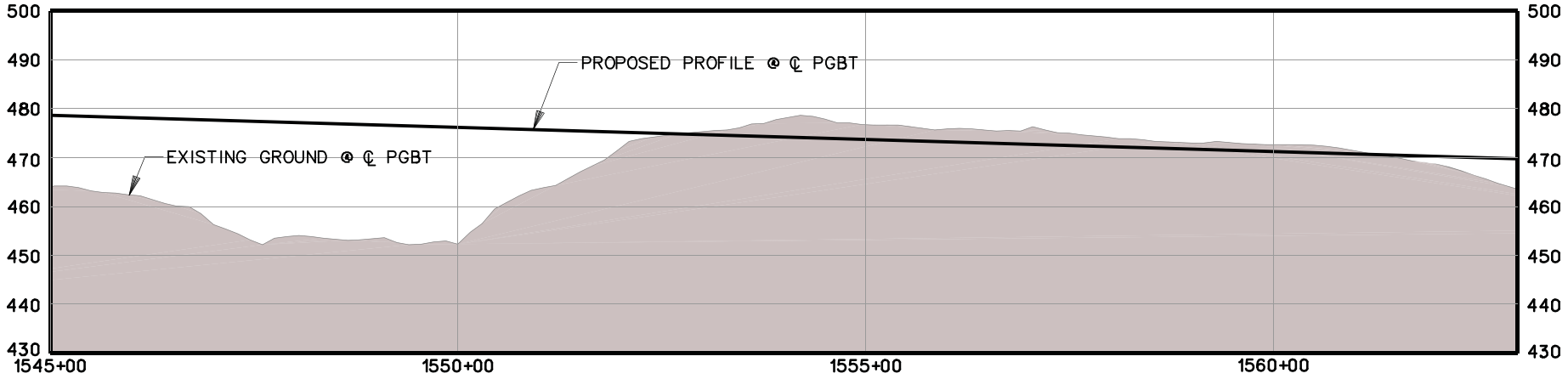

MATCHLINE STA 1509+00
LAKE FOREST DR
NORTHBOUND FRONTAGE ROAD
MILLER RD
℄ PGBT
ROW
HARBORVIEW BLVD
1510+00
1515+00
1520+00
1525+00
ROW
SOUTHBOUND FRONTAGE ROAD
LEGEND
Existing Roadway
Existing Bridge
Pavement Removal
Proposed Roadway (Main Lanes & Frontage Roads)
Proposed Roadway (Ramps & Direct Connectors)
Proposed Bridge
Electronic Toll Collection (ETC) Gantry
Proposed Retaining Wall
Proposed Sound Wall
Traffic Arrow

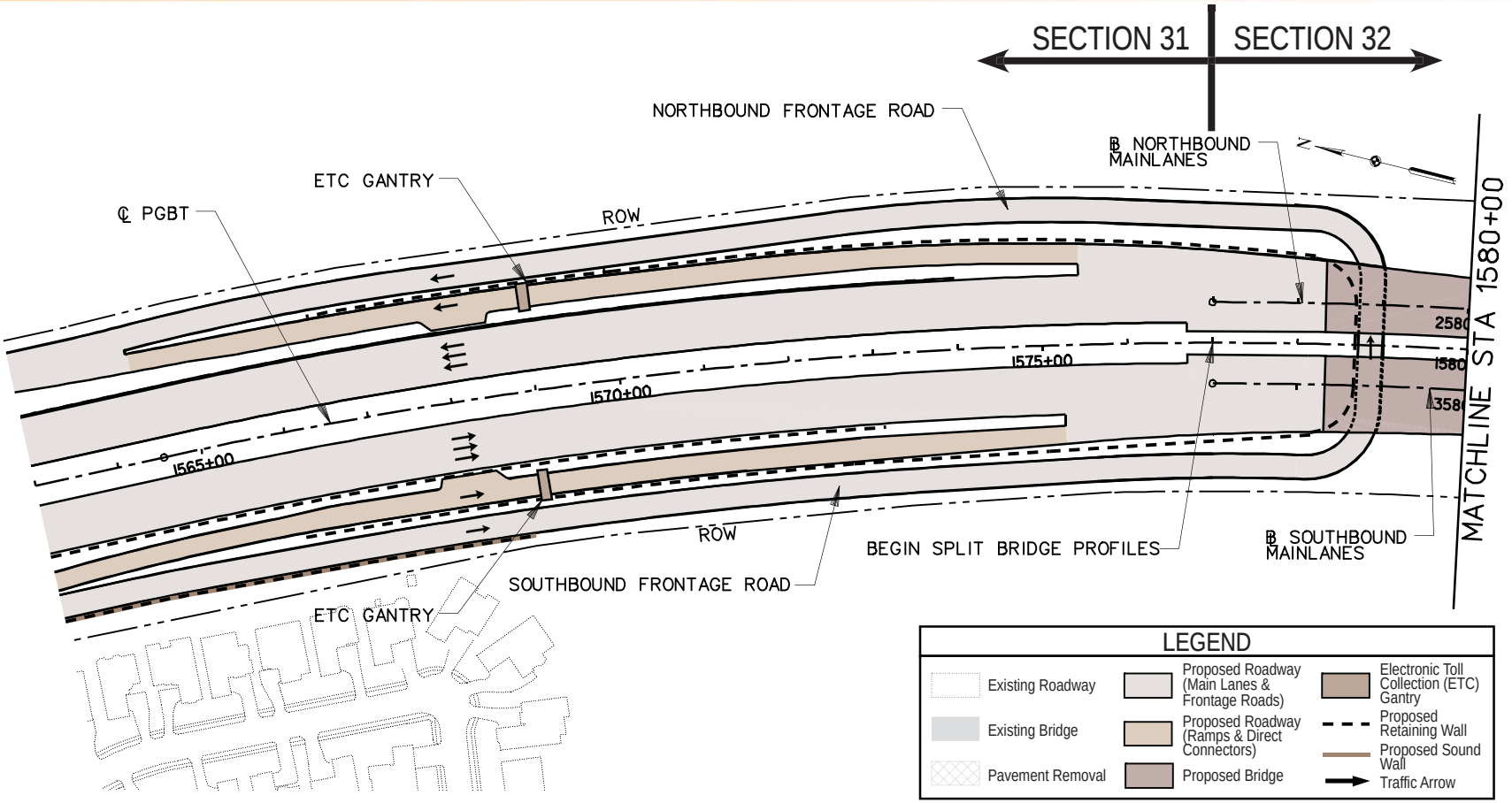

PROPOSED PROFILE @ ℄ PGBT
+2.75%
-2.29%
L = 600.00'
+2.75%
MILLER RD
EXISTING GROUND @ ℄ PGBT
L = 1,275.00'
540
530
520
510
500
490
480
470
1510+00
1515+00
1520+00
1525+00

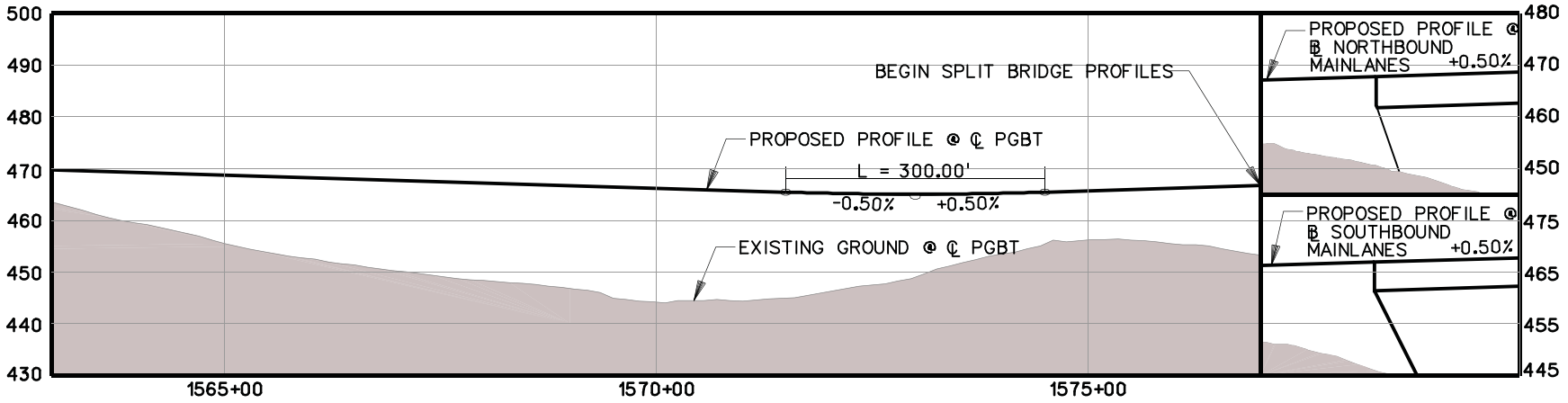

NORTHBOUND FRONTAGE ROAD
ROW
N
MATCHLINE STA 1545+00
1530+00
1535+00
1540+00
1545
℄ PGBT
SOUTHBOUND FRONTAGE ROAD
GLISTENING SPRINGS RD
ROW
KIRBY RD

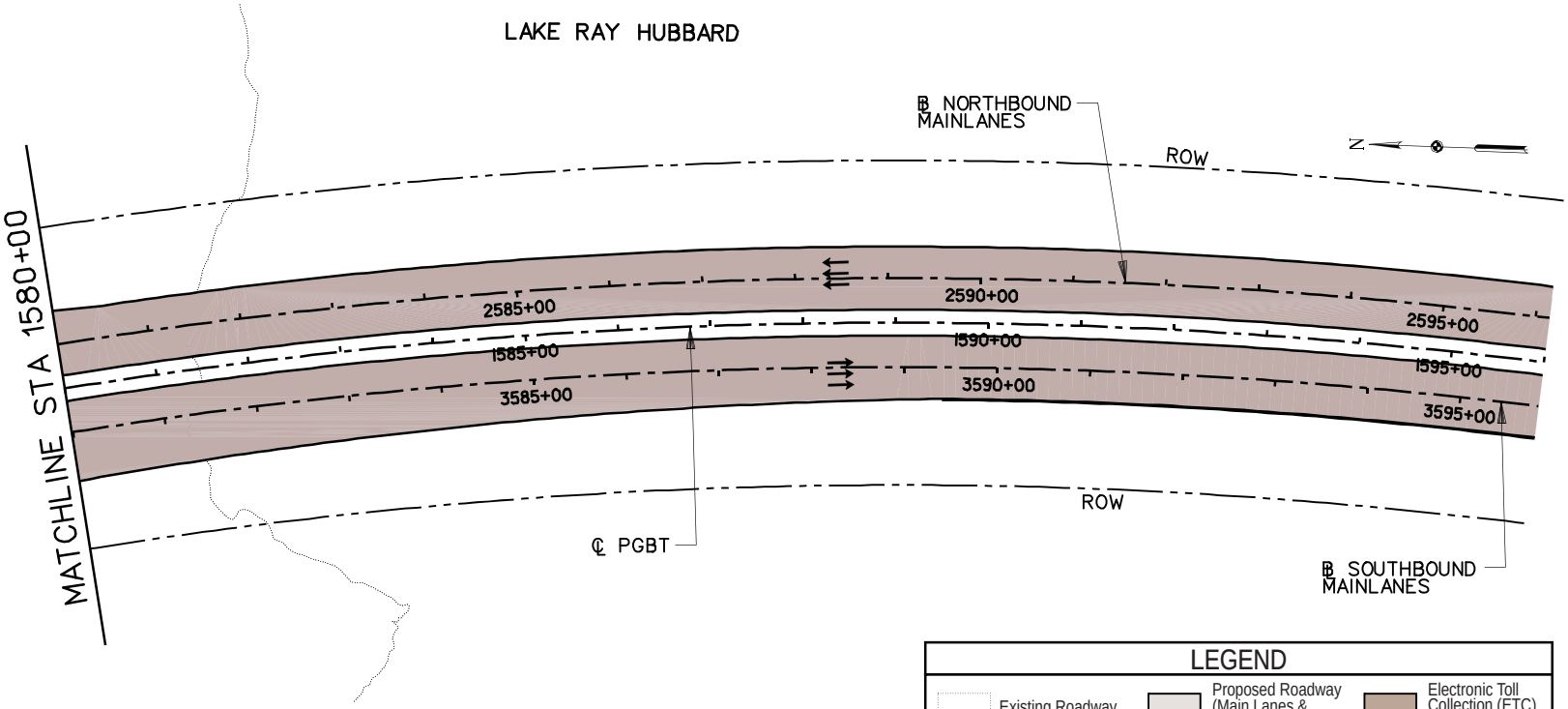

520
510
500
490
480
470
460
450
PROPOSED PROFILE @ ℄ PGBT
L = 500.00'
-2.29%
-0.50%
EXISTING GROUND @ ℄ PGBT
1530+00
1535+00
1540+00
1545+00

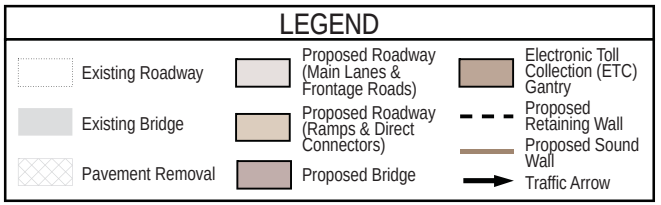

MATCHLINE STA 1545+00
NORTHBOUND FRONTAGE ROAD
℄ PGBT
ROW
1550+00
1555+00
1560+00
ROW
SOUTHBOUND FRONTAGE ROAD

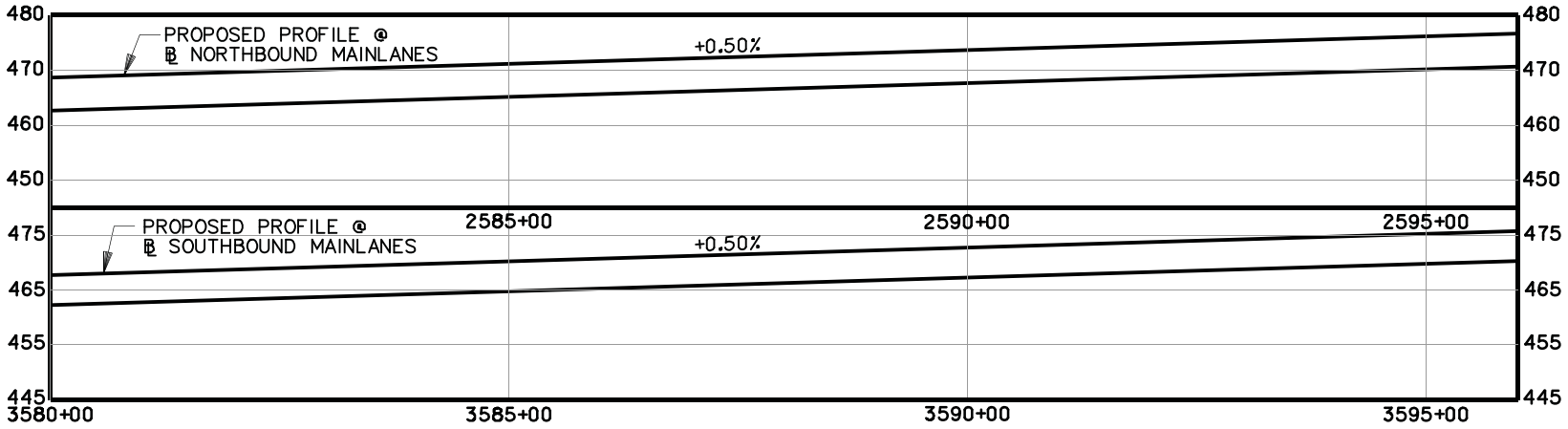

500
490
480
470
460
450
440
430
PROPOSED PROFILE @ ℄ PGBT
EXISTING GROUND @ ℄ PGBT
1545+00
1550+00
1555+00
1560+00

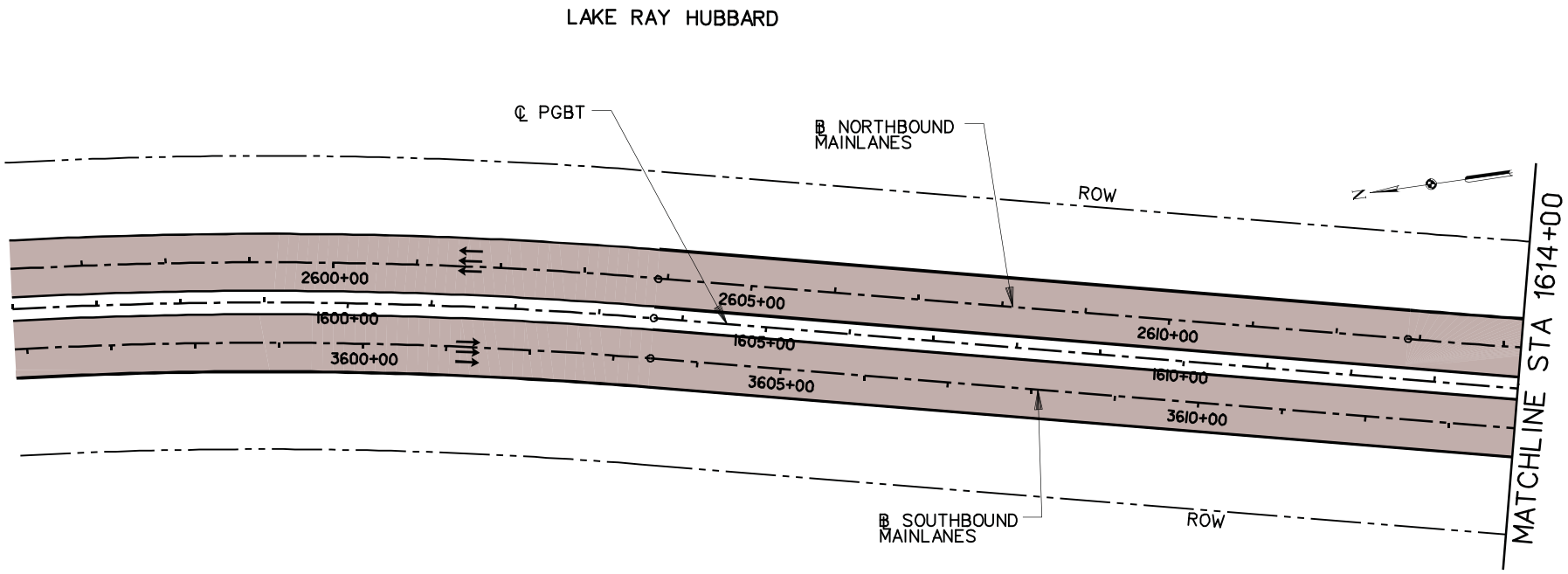

SECTION 31
SECTION 32
NORTHBOUND FRONTAGE ROAD
℄ NORTHBOUND MAINLANES
ETC GANTRY
℄ PGBT
ROW
1575+00
1570+00
1565+00
MATCHLINE STA 1580+00
ROW
BEGIN SPLIT BRIDGE PROFILES
℄ SOUTHBOUND MAINLANES
SOUTHBOUND FRONTAGE ROAD
ETC GANTRY
LEGEND
Existing Roadway
Existing Bridge
Pavement Removal
Proposed Roadway (Main Lanes & Frontage Roads)
Proposed Roadway (Ramps & Direct Connectors)
Proposed Bridge
Electronic Toll Collection (ETC) Gantry
Proposed Retaining Wall
Proposed Sound Wall
Traffic Arrow

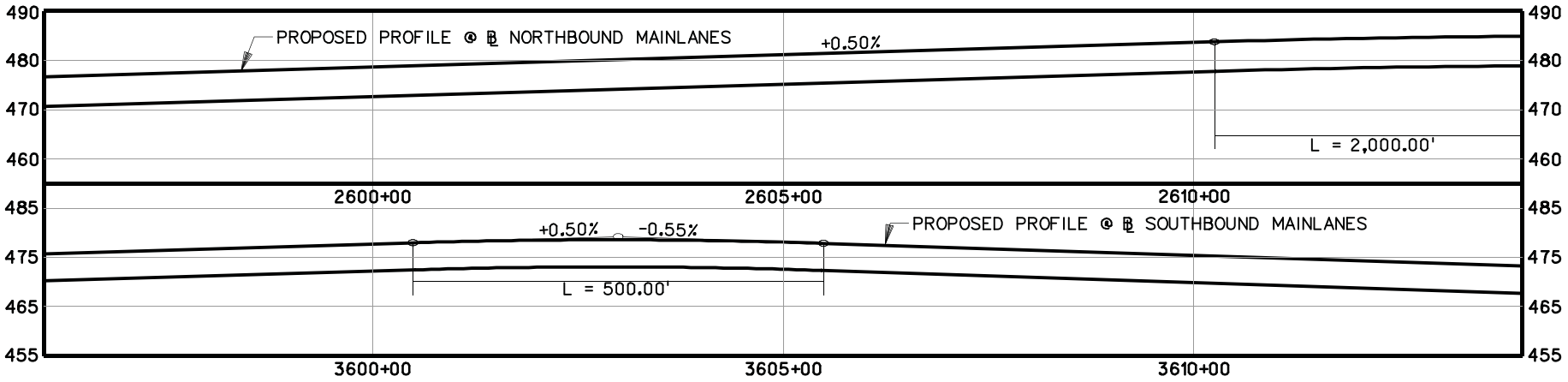

500
490
480
470
460
450
440
430
480
470
460
450
475
465
455
445
BEGIN SPLIT BRIDGE PROFILES
PROPOSED PROFILE @ ℄ PGBT
L = 300.00'
-0.50%
+0.50%
EXISTING GROUND @ ℄ PGBT
PROPOSED PROFILE @ ℄ NORTHBOUND MAINLANES +0.50%
PROPOSED PROFILE @ ℄ SOUTHBOUND MAINLANES +0.50%
1565+00
1570+00
1575+00

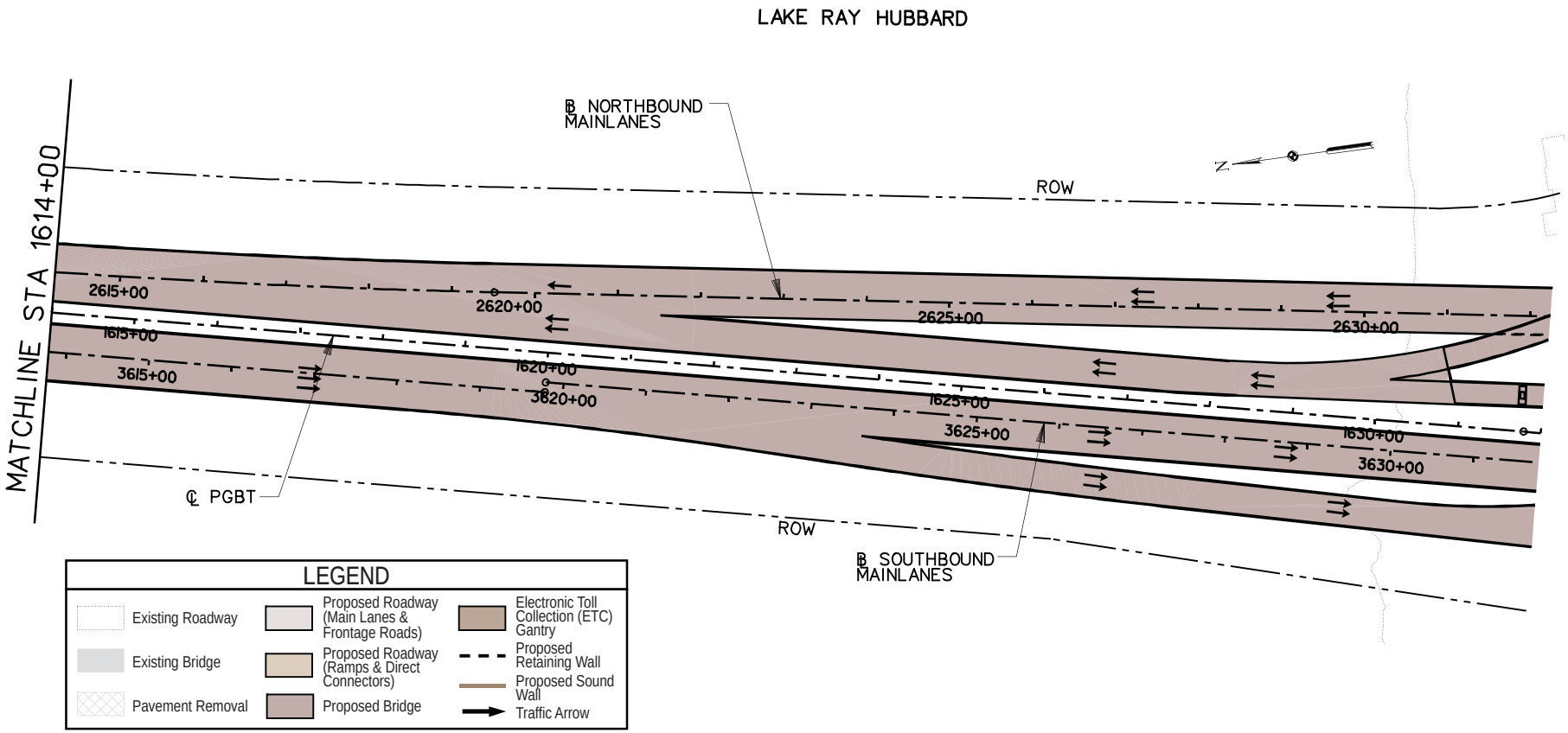

LAKE RAY HUBBARD
℄ NORTHBOUND MAINLANES
ROW
N
MATCHLINE STA 1580+00
2585+00
2590+00
2595+00
1585+00
1590+00
1595+00
3585+00
3590+00
3595+00
ROW
℄ PGBT
℄ SOUTHBOUND MAINLANES

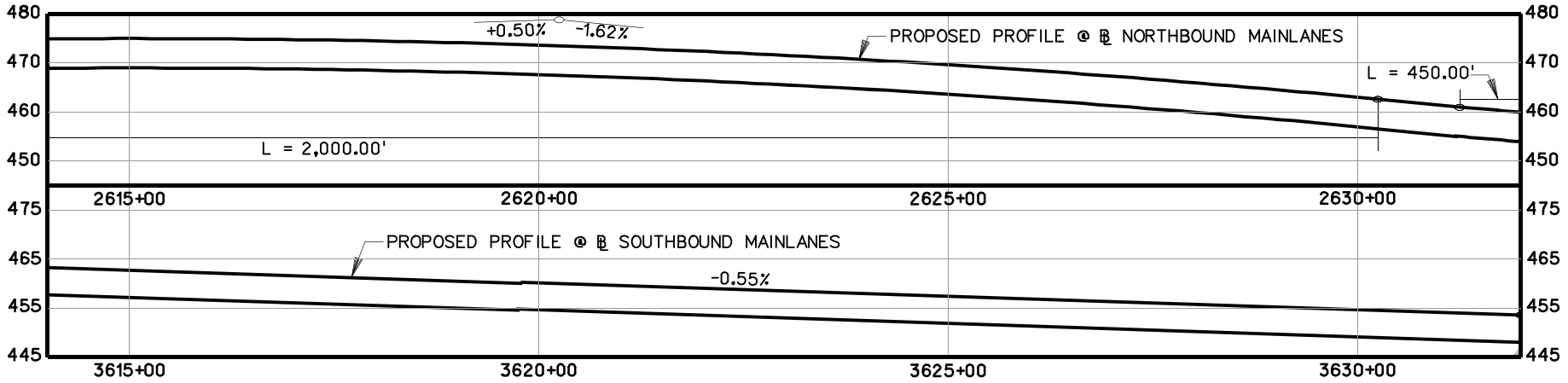

LEGEND
Existing Roadway
Existing Bridge
Pavement Removal
Proposed Roadway (Main Lanes & Frontage Roads)
Proposed Roadway (Ramps & Direct Connectors)
Proposed Bridge
Electronic Toll Collection (ETC) Gantry
Proposed Retaining Wall
Proposed Sound Wall
Traffic Arrow


480
470
460
450
PROPOSED PROFILE @
℄ NORTHBOUND MAINLANES
+0.50%
475
465
455
445
PROPOSED PROFILE @
℄ SOUTHBOUND MAINLANES
+0.50%
2585+00
2590+00
2595+00
3580+00
3585+00
3590+00
3595+00


LAKE RAY HUBBARD
℄ PGBT
℄ NORTHBOUND MAINLANES
ROW
2600+00
1600+00
3600+00
2605+00
1605+00
3605+00
2610+00
1610+00
3610+00
MATCHLINE STA 1614+00
℄ SOUTHBOUND MAINLANES
ROW


490
480
470
460
485
475
465
455
PROPOSED PROFILE @ ℄ NORTHBOUND MAINLANES
+0.50%
L = 2,000.00'
2600+00
2605+00
2610+00
+0.50%
-0.55%
PROPOSED PROFILE @ ℄ SOUTHBOUND MAINLANES
L = 500.00'
3600+00
3605+00
3610+00


LAKE RAY HUBBARD
℄ NORTHBOUND MAINLANES
ROW
MATCHLINE STA 1614+00
2615+00
2620+00
2625+00
2630+00
1615+00
1620+00
1625+00
1630+00
3615+00
3620+00
3625+00
3630+00
℄ PGBT
ROW
℄ SOUTHBOUND MAINLANES
LEGEND
Existing Roadway
Existing Bridge
Pavement Removal
Proposed Roadway (Main Lanes & Frontage Roads)
Proposed Roadway (Ramps & Direct Connectors)
Proposed Bridge
Electronic Toll Collection (ETC) Gantry
Proposed Retaining Wall
Proposed Sound Wall
Traffic Arrow


480
470
460
450
475
465
455
445
+0.50%
-1.62%
PROPOSED PROFILE @ ℄ NORTHBOUND MAINLANES
L = 450.00'
L = 2,000.00'
2615+00
2620+00
2625+00
2630+00
PROPOSED PROFILE @ ℄ SOUTHBOUND MAINLANES
-0.55%
3615+00
3620+00
3625+00
3630+00

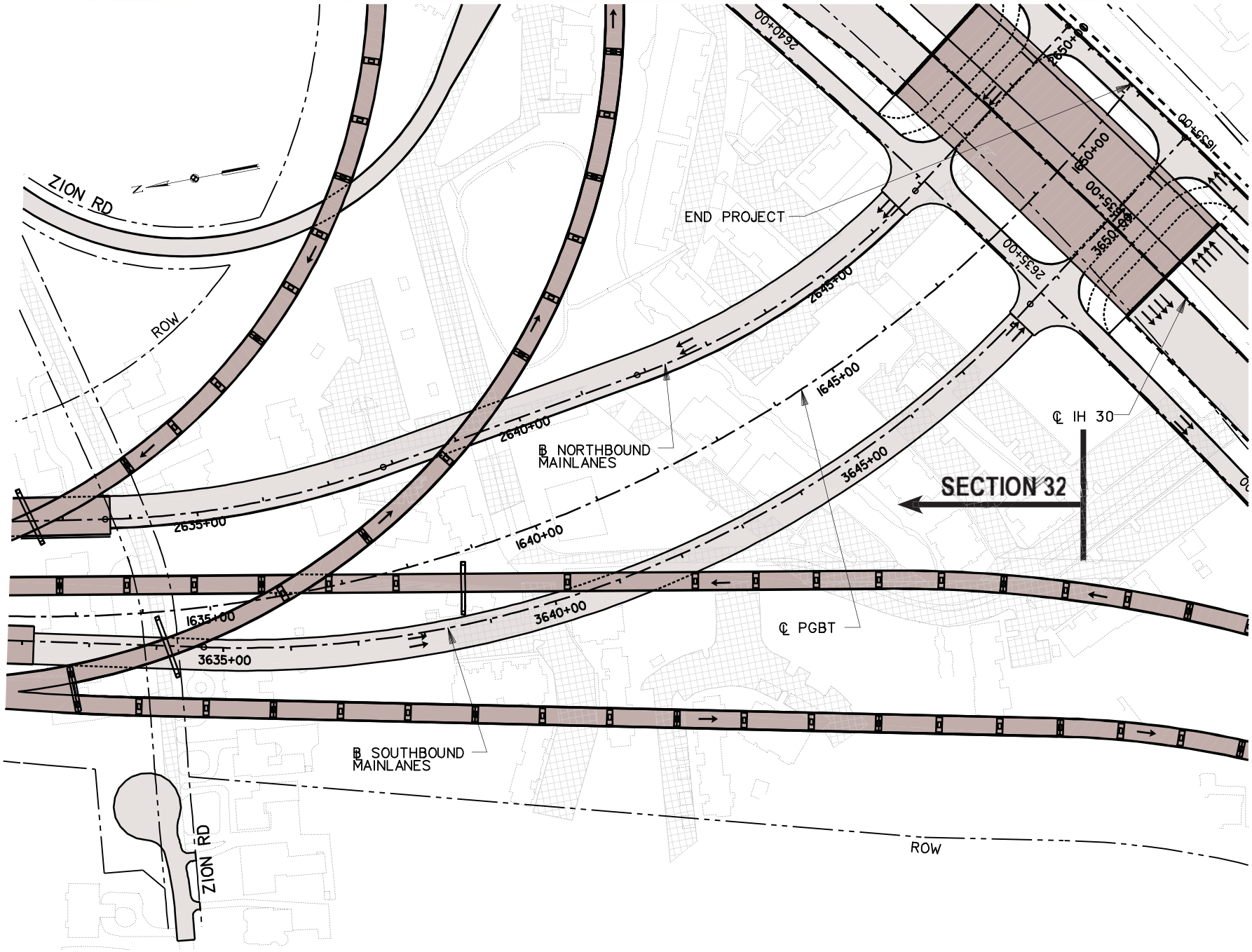
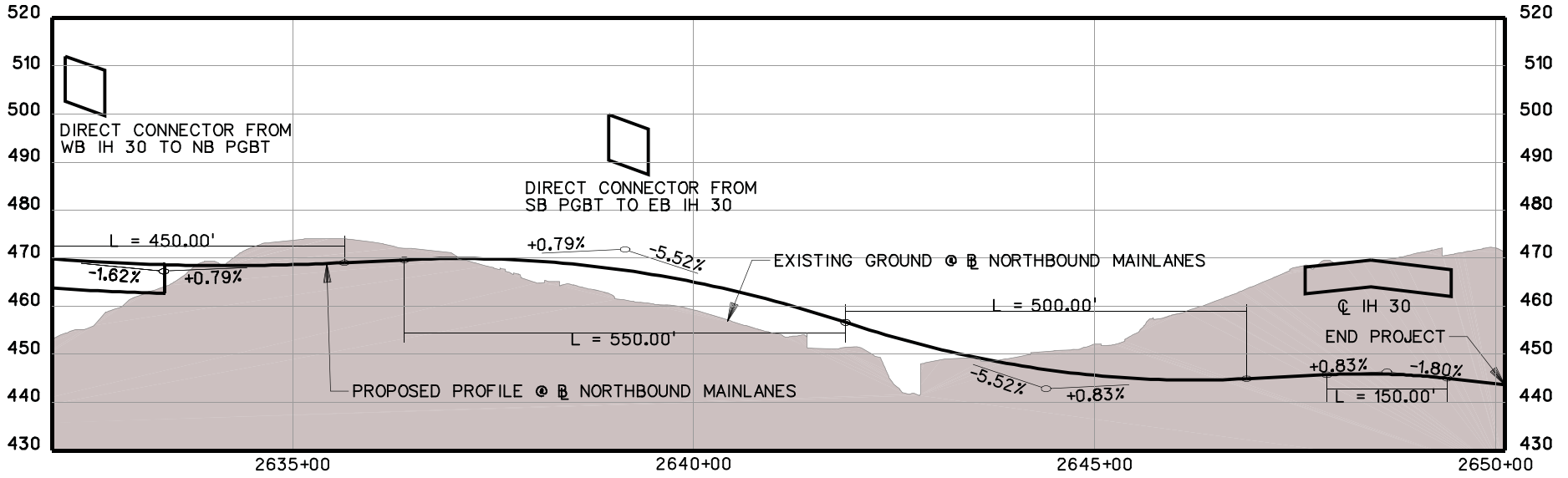
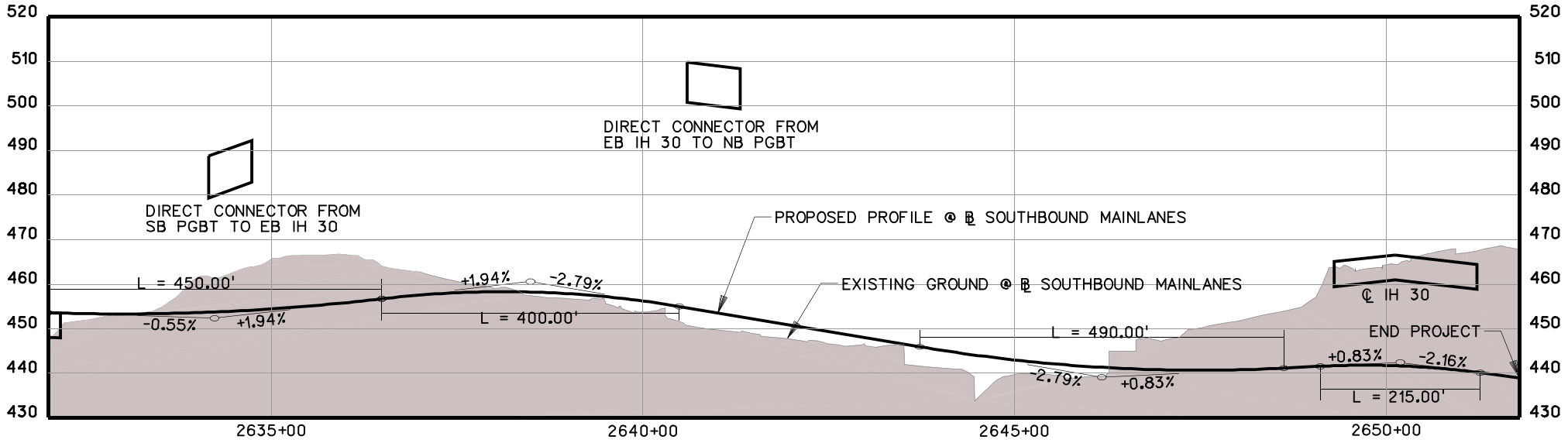
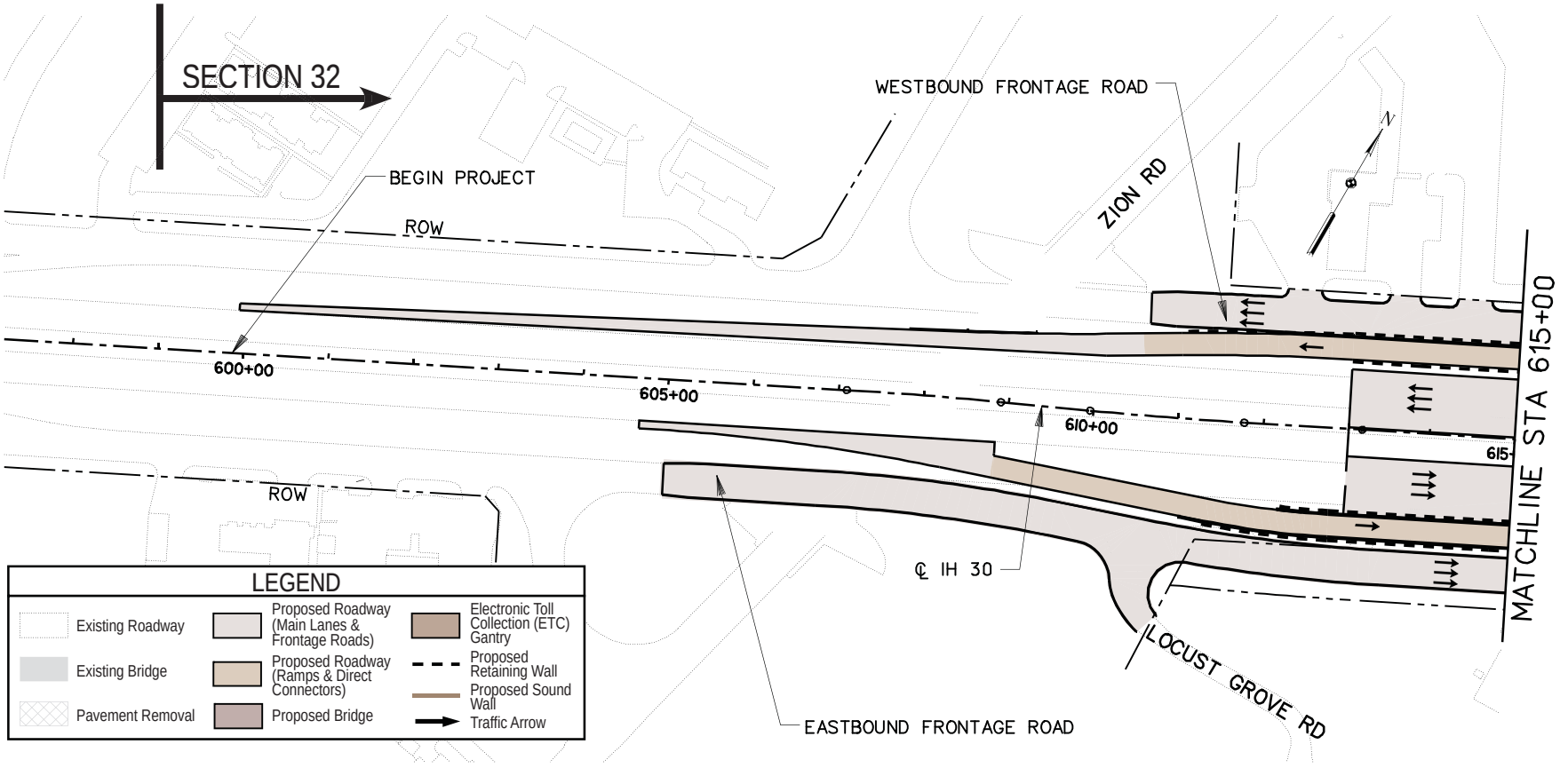
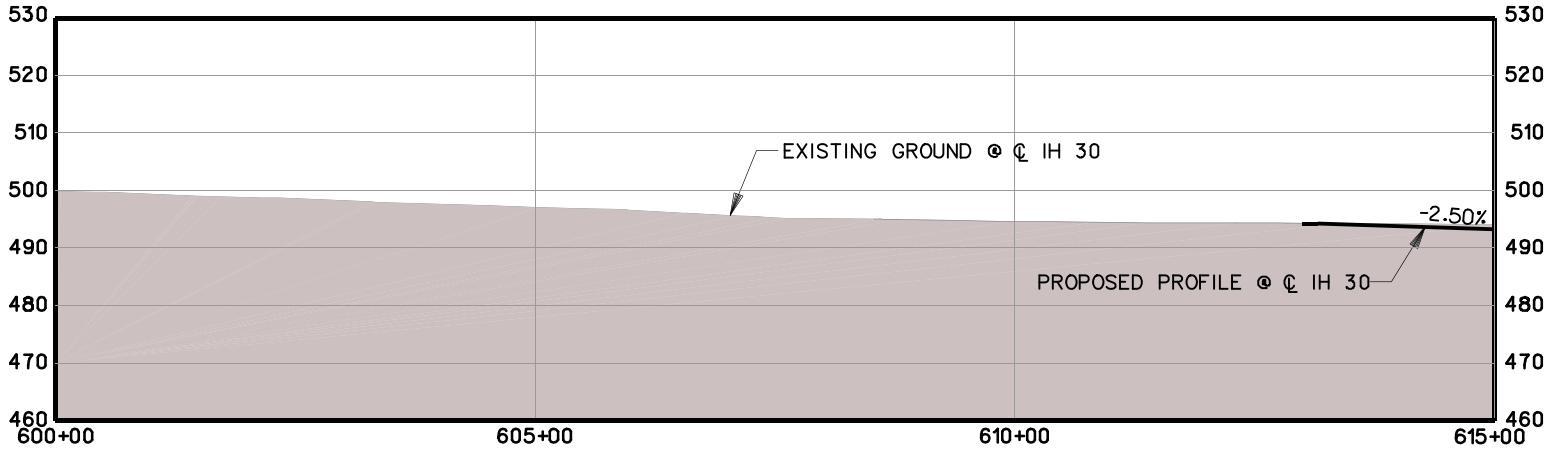

ZION RD
ROW
END PROJECT
℄ NORTHBOUND MAINLANES
℄ SOUTHBOUND MAINLANES
℄ PGBT
℄ IH 30
SECTION 32
2640+00
2650+00
1650+00
2635+00
2645+00
1645+00
2640+00
3645+00
2635+00
1640+00
1635+00
3640+00
3635+00
ZION RD
ROW

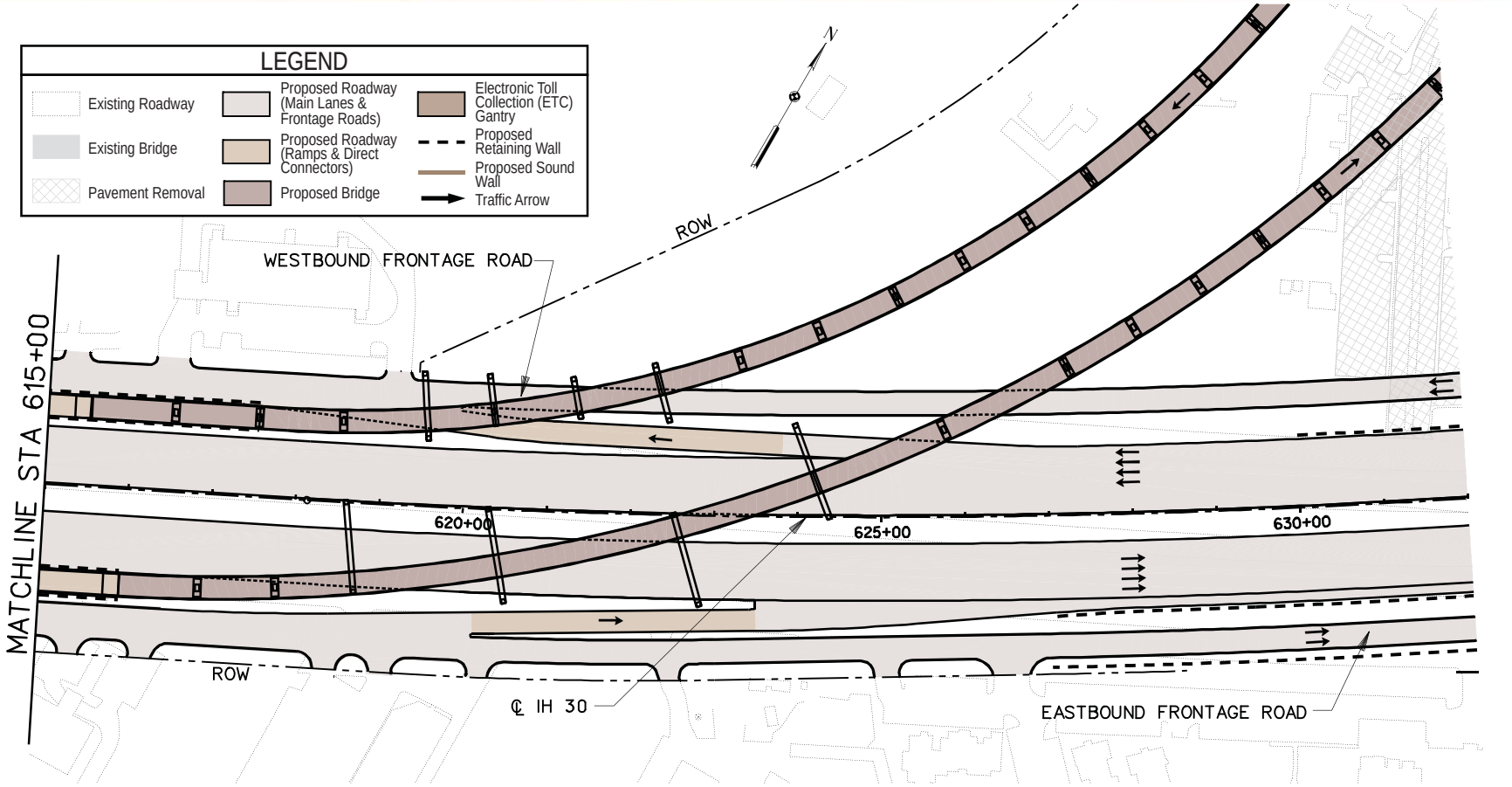
Plate 16 Profiles

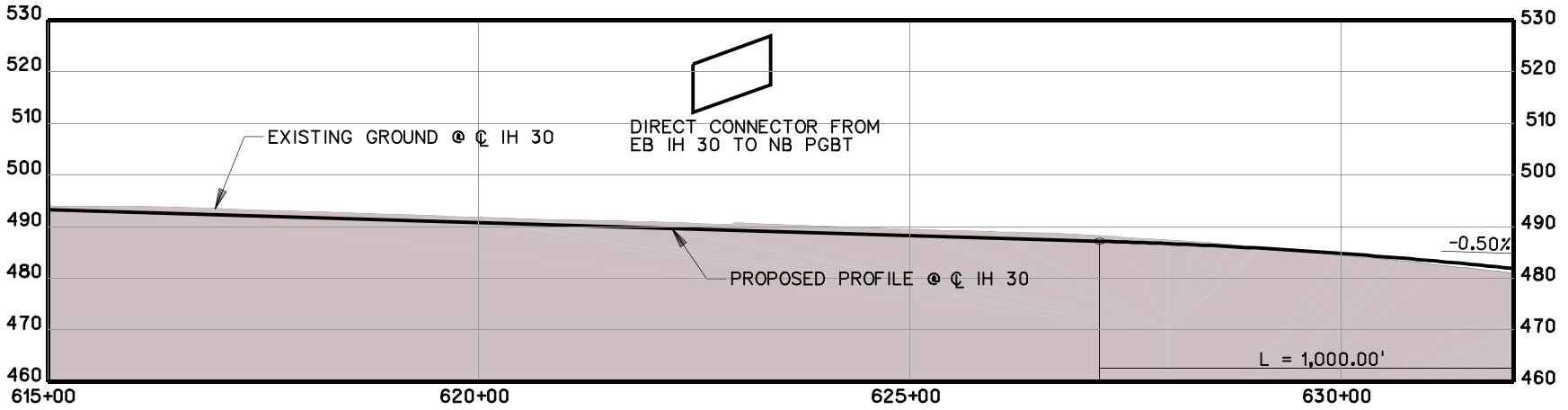


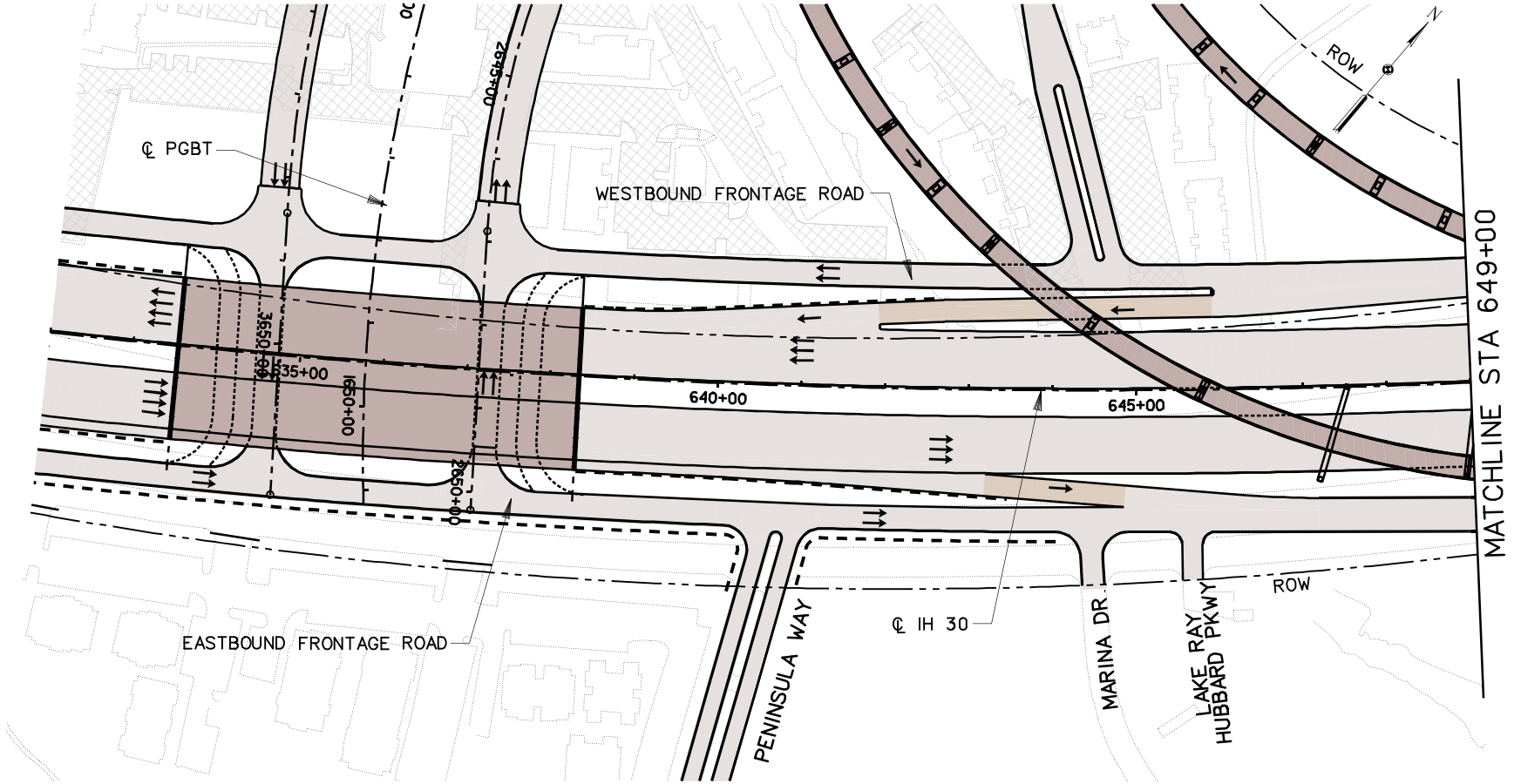


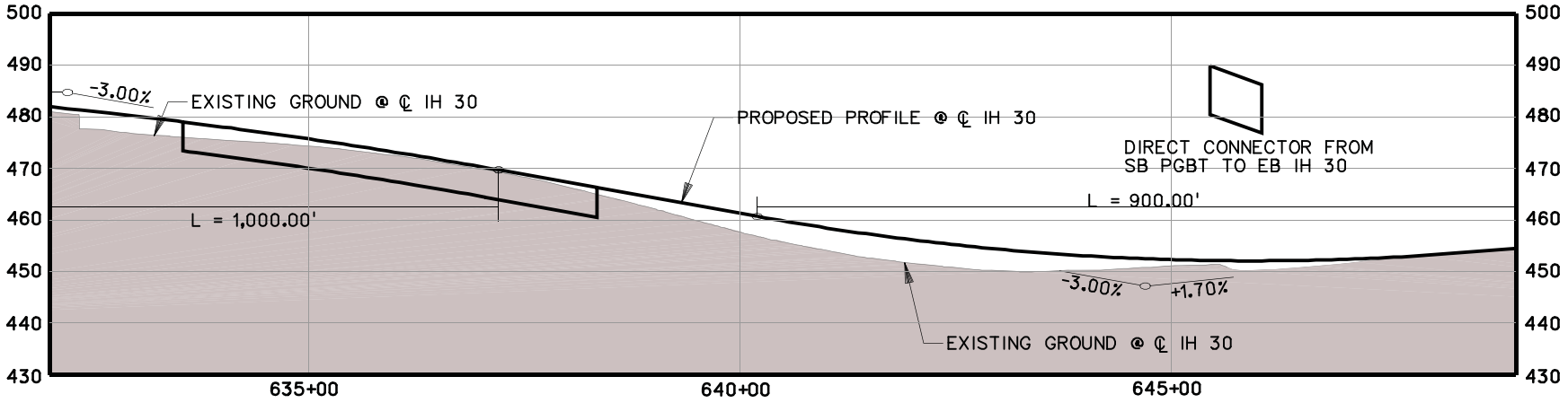

SECTION 32
WESTBOUND FRONTAGE ROAD
BEGIN PROJECT
ROW
ZION RD
600+00
605+00
610+00
615+00
MATCHLINE STA 615+00
ROW
℄ IH 30
EASTBOUND FRONTAGE ROAD
LOCUST GROVE RD
LEGEND
Existing Roadway
Existing Bridge
Pavement Removal
Proposed Roadway (Main Lanes & Frontage Roads)
Proposed Roadway (Ramps & Direct Connectors)
Proposed Bridge
Electronic Toll Collection (ETC) Gantry
Proposed Retaining Wall
Proposed Sound Wall
Traffic Arrow

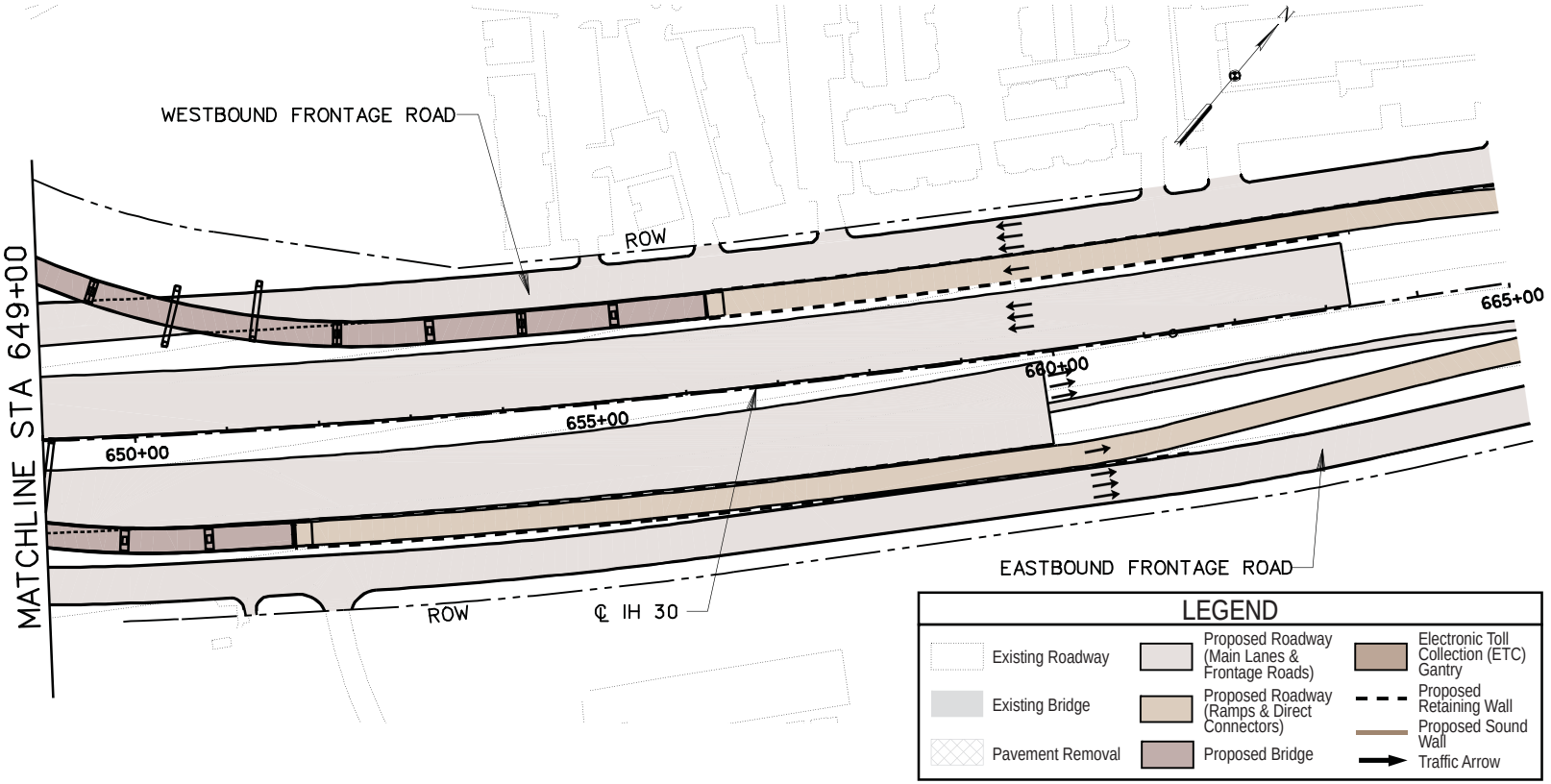

530
520
510
500
490
480
470
460
EXISTING GROUND @ ℄ IH 30
-2.50%
PROPOSED PROFILE @ ℄ IH 30
600+00
605+00
610+00
615+00

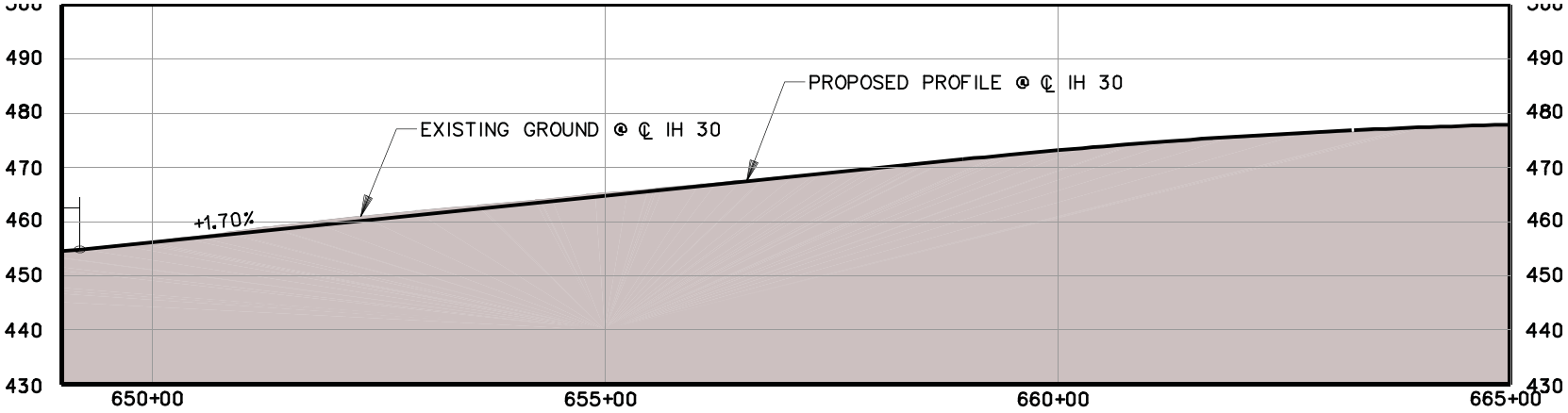

LEGEND
Existing Roadway
Existing Bridge
Pavement Removal
Proposed Roadway (Main Lanes & Frontage Roads)
Proposed Roadway (Ramps & Direct Connectors)
Proposed Bridge
Electronic Toll Collection (ETC) Gantry
Proposed Retaining Wall
Proposed Sound Wall
Traffic Arrow
N
ROW
WESTBOUND FRONTAGE ROAD
MATCHLINE STA 615+00
620+00
625+00
630+00
ROW
℄ IH 30
EASTBOUND FRONTAGE ROAD

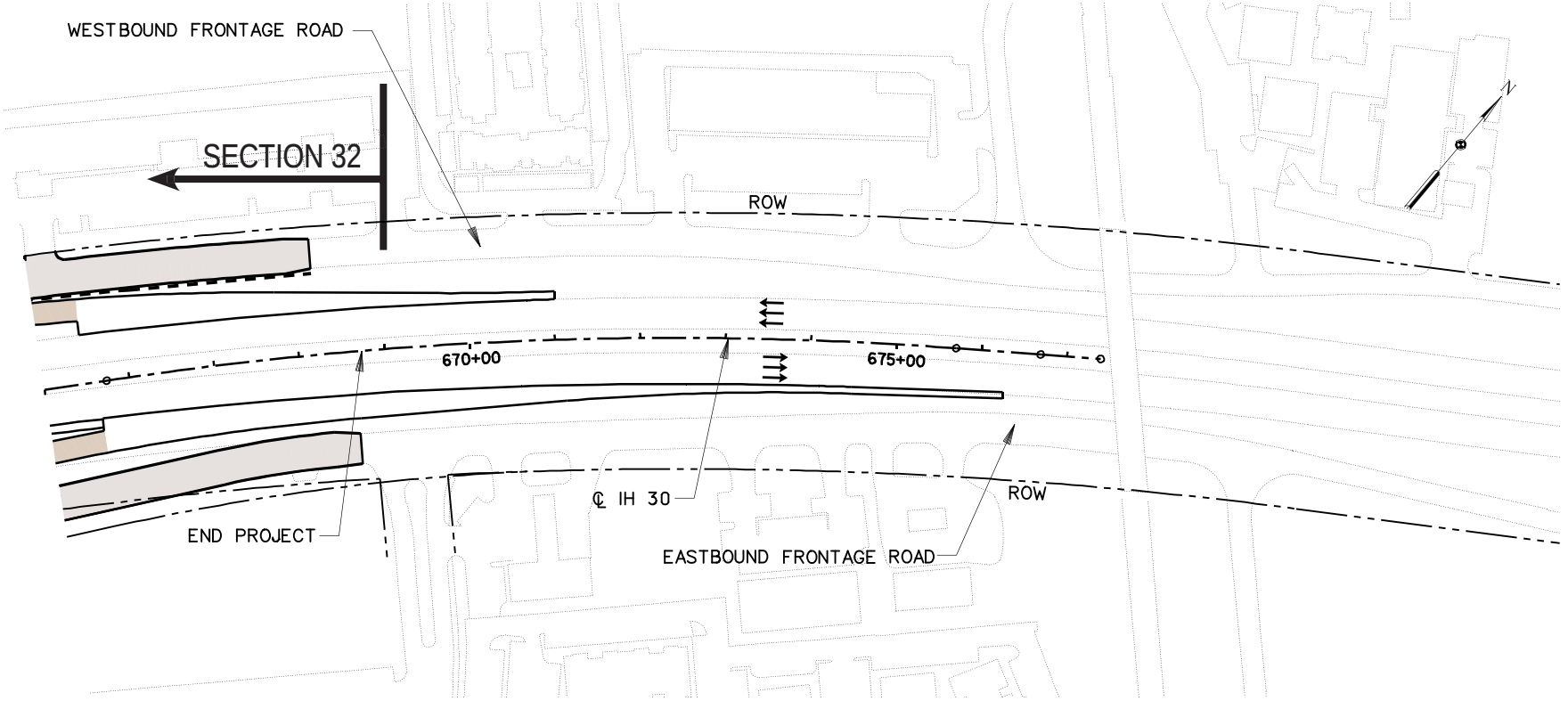

530
520
510
500
490
480
470
460
EXISTING GROUND @ ℄ IH 30
DIRECT CONNECTOR FROM EB IH 30 TO NB PGBT
PROPOSED PROFILE @ ℄ IH 30
-0.50%
L = 1,000.00'
615+00
620+00
625+00
630+00

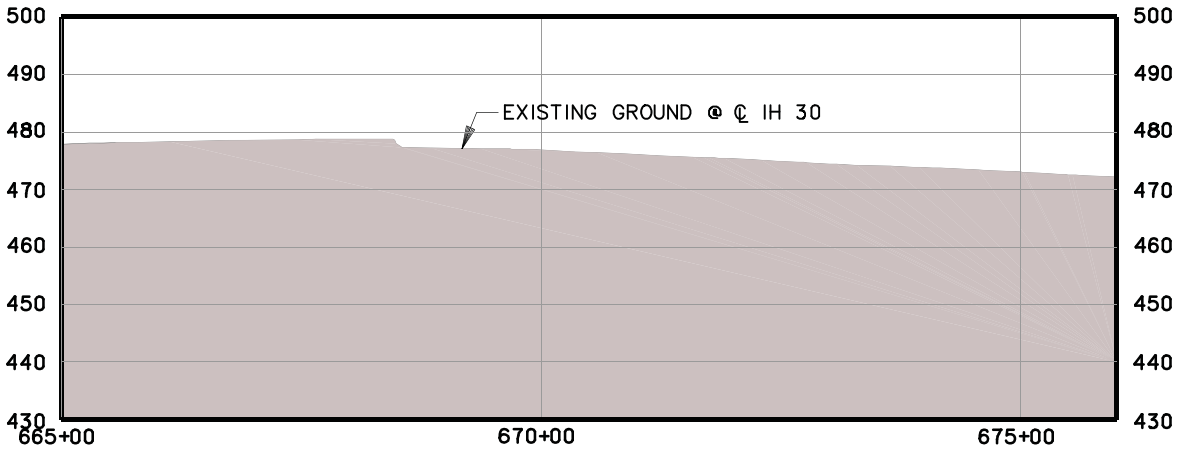

℄ PGBT
WESTBOUND FRONTAGE ROAD
EASTBOUND FRONTAGE ROAD
℄ IH 30
PENINSULA WAY
MARINA DR
LAKE RAY HUBBARD PKWY
ROW
ROW
MATCHLINE STA 649+00
635+00
640+00
645+00
2675+00
2650+00
1650+00
3550+00


500
490
480
470
460
450
440
430
-3.00%
EXISTING GROUND @ ℄ IH 30
PROPOSED PROFILE @ ℄ IH 30
DIRECT CONNECTOR FROM
SB PGBT TO EB IH 30
L = 1,000.00'
L = 900.00'
-3.00%
+1.70%
EXISTING GROUND @ ℄ IH 30
635+00
640+00
645+00


WESTBOUND FRONTAGE ROAD
ROW
MATCHLINE STA 649+00
650+00
655+00
660+00
665+00
EASTBOUND FRONTAGE ROAD
ROW
℄ IH 30
LEGEND
Existing Roadway
Existing Bridge
Pavement Removal
Proposed Roadway (Main Lanes & Frontage Roads)
Proposed Roadway (Ramps & Direct Connectors)
Proposed Bridge
Electronic Toll Collection (ETC) Gantry
Proposed Retaining Wall
Proposed Sound Wall
Traffic Arrow


490
480
470
460
450
440
430
PROPOSED PROFILE @ ℄ IH 30
EXISTING GROUND @ ℄ IH 30
+1.70%
650+00
655+00
660+00
665+00


WESTBOUND FRONTAGE ROAD
SECTION 32
ROW
670+00
675+00
℄ IH 30
ROW
END PROJECT
EASTBOUND FRONTAGE ROAD
N


500
490
480
470
460
450
440
430
EXISTING GROUND @ ℄ IH 30
665+00
670+00
675+00