

BASELINE CONDITIONS

What is the baseline visual character of the study area?

The Washington State Department of Transportation (WSDOT) *Roadside Classification Plan* (WSDOT, 1996) classifies the I-405 corridor between NE 6th Street in Bellevue and I-5 in Lynnwood as urban, semi-urban, and rural. The southernmost portion of the project area to SR 520 is classified as urban. North of SR 520 through approximately NE 140th Street in unincorporated King County is classified as semi-urban. North of this point, I-405 is classified as rural. The baseline conditions surrounding the I-405 corridor range from heavily forested to relatively densely developed, with mixed land uses. Terrain of the freeway corridor ranges from flat to gently rolling. Adjacent areas are flat to hilly, with ridges and hills to both the east and west in some parts of the corridor. Several parks are adjacent to the freeway corridor, but are generally not highly visible from the freeway itself.

The baseline conditions for the Bellevue to Lynnwood Improvement Project include improvements made for the Kirkland Nickel Project, the NE 195th Street to SR 527 Auxiliary Lane Project, and the NE 8th to SR 520 Braided Ramps Project due to the overlap in project footprints.

The *I-405 Corridor Program Draft Visual Resources Expertise Report* (David Evans and Associates [DEA], 2001) identifies the landscape character units surrounding the study area (Exhibits 7 and 8), which include the Bellevue to Lynnwood Improvement Project study area.

Exhibit 7: Landscape character units and description

Landscape character unit	Description
Bellevue	The setting and character are generally urban in nature. This is a developed area with mid- and high-rise buildings, roadways, highways, and overpasses. Vegetation is limited.
Overlake	This landscape character unit includes urban and suburban development. Commercial strip development and transportation facilities are noticeable; trees and other vegetation are visible but subordinate to the built features.
Bridle Trails State Park	This is a linear, wooded park, separated from I-405 by 116th Avenue NE and a row of single-family homes. The park is not readily noticeable from I-405.
Watershed Park	This wooded park is bisected by I-405 and is surrounded with single-family residential development. The park is not readily noticeable from I-405.
Kirkland	The Kirkland landscape character unit encompasses a large area of residential neighborhoods (comprised of primarily single-family homes) with some commercial land uses. The character of the built environment is general suburban. Developed areas include large trees and roadways.
Spinney Homestead Park	This is a small neighborhood park with open play fields, screened from I-405 by an earthen berm. The park is not readily visible from I-405.
Totem Lake	Totem Lake is primarily an urban area with commercial and light industrial development, including the Totem Lake Mall and other shopping areas. The area includes some multi-family residential development. The area is highly developed and areas of vegetation are visible as I-405 traverses this landscape character unit.
Kingsgate	Kingsgate is primarily a single-family residential area, with roadways and mature vegetation.
Edith Moulton Park	This is a small wooded park west of I-405 separated from the freeway by a row of houses. The park is not evident from I-405.
Kingsgate Park	Kingsgate Park is a small wooded area with no developed facilities. It is not evident from I-405.
Bothell	This landscape unit encompasses both sides of I-405. It includes multi-family and single-family residential, a mobile home park, and the I-405/SR 522 interchange. This landscape character unit includes stands of mature trees, relatively large undeveloped areas (such as those adjacent to the I-405/SR 522 interchange), and highly evident, major transportation infrastructure (I-405, SR 522).
Snohomish County	The Snohomish County landscape character unit is semi-rural in character, with generally low-density residential development, transportation infrastructure, open spaces, and stands of mature vegetation. It includes the I-405/I-5 junction.

Exhibit 8: Landscape character units - sheet 1 of 2

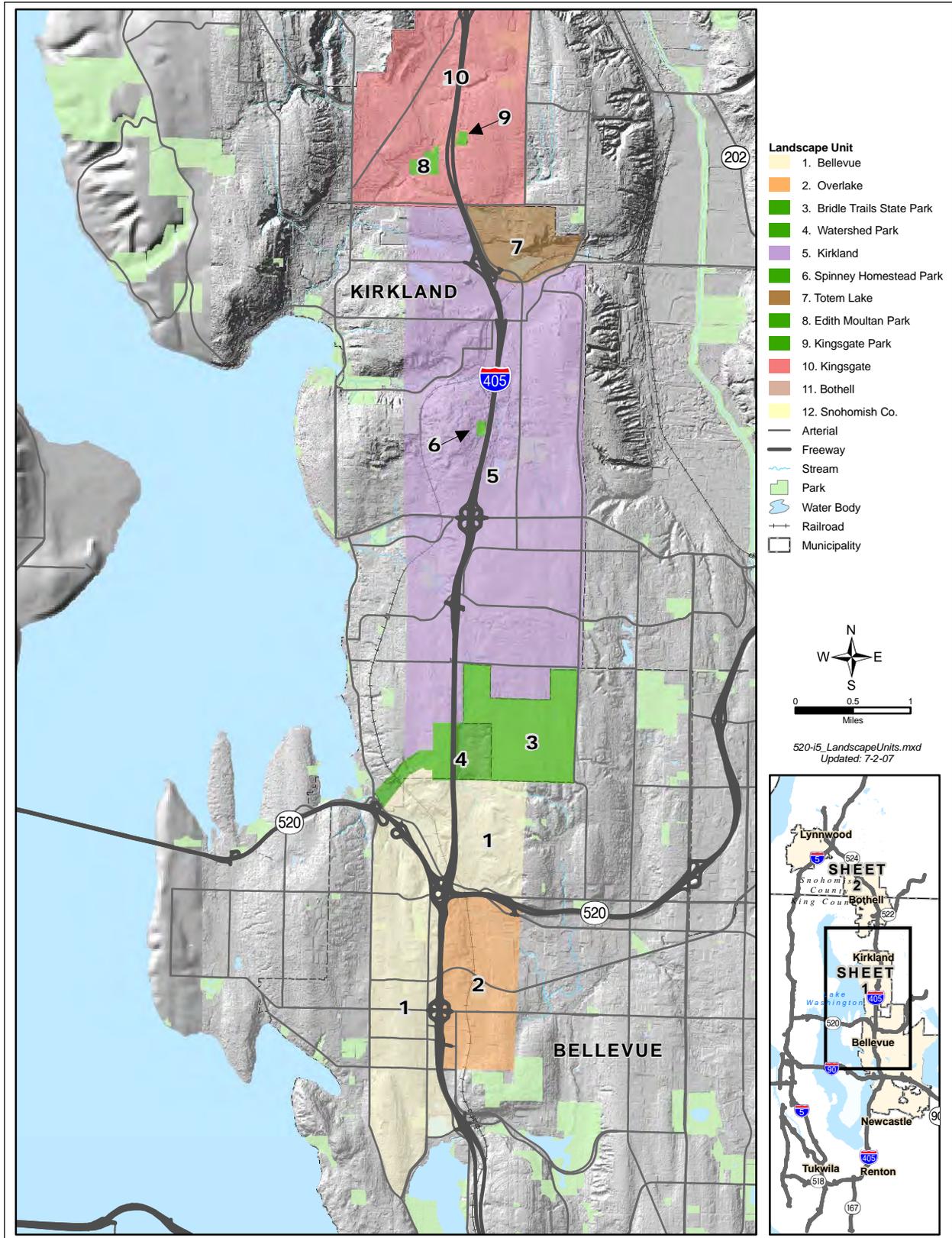
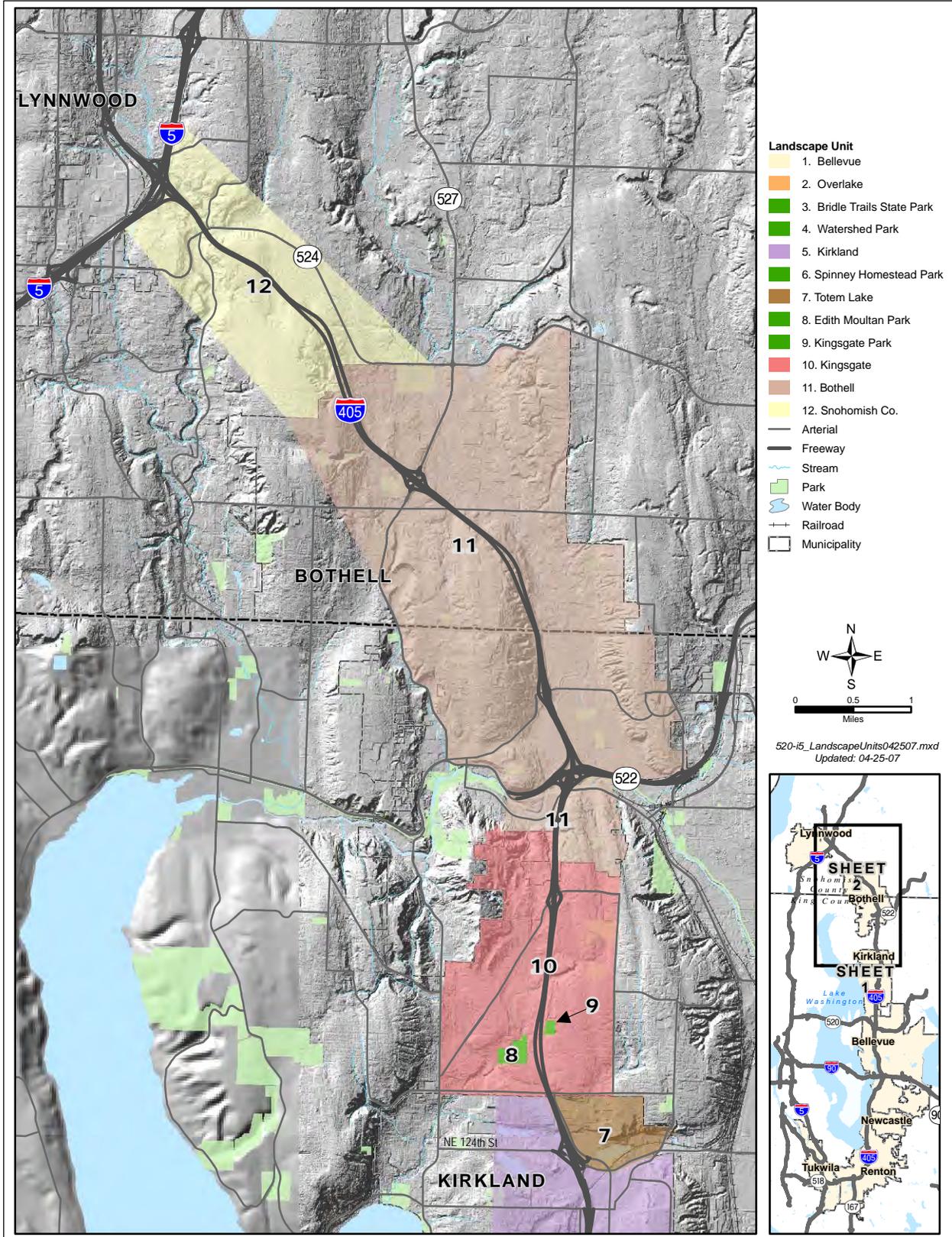


Exhibit 8: Landscape character units - sheet 2 of 2



What are the “viewpoints,” how did we select them, and what is the visual quality of the views?

Representative views of the project are described below. Viewpoints were identified to represent areas where large numbers of viewers will be present, the existing I-405 corridor is visible, and the build alternatives are anticipated to create changes in the visual environment.

Seven representative viewpoints were selected (see Exhibit 6) for visual quality evaluation (see Appendix B). Due to the overlap in the project areas of the Bellevue to Lynnwood Improvement Project and the Kirkland Nickel Project, several of the same viewpoints were selected for evaluation. Viewpoints were selected based on their safe and easy accessibility; viewpoints from individual residences were not specifically addressed.

Representative views , south to north

I-405 at NE 60th Street (views to the south [A] and north [B])

A pedestrian bridge crosses over I-405 near the southern limits of the project area linking NE 60th Street on the west side of I-405 to the neighborhoods and Bridle Trails State Park on the east side of I-405. The freeway in this location is relatively straight and level, aligned in a north-south direction.

Representative View A (see Exhibit 9 and Appendix C) looks southbound from the vicinity of the pedestrian bridge along the travel lanes of southbound I-405. The primary viewer group is highway users who are in a level position. I-405 is in the foreground and there are distant views of hills and the roadway. The sides of the roadway are well vegetated with trees and shrubs. A noise barrier encroaches on the west side of the project, ending just south of the pedestrian bridge. The roadway itself dominates the view; the project’s constructed elements lack vividness and unity. Overall visual quality is rated at 2.7 out of 7, moderately low.

Representative View B (see Exhibit 9 and Appendix C) looks northbound from the vicinity of the pedestrian bridge along the travel lanes of northbound I-405. The primary viewer group is highway users who are in a level position. I-405 is in the foreground with distant views of the NE 70th Street interchange. The sides of the freeway are well

Exhibit 9: I-405 at NE 60th Street (Views A and B)



vegetated with medium to large trees. A noise wall encroaches on the southbound side of the facility. The freeway itself dominates the view; constructed elements lack vividness and unity. Total visual quality is rated 2.7 out of 7, moderately low.

I-405 at the NE 124th Street overcrossing (view to north)

Representative View C (see Exhibit 10 and Appendix C) looks northbound from the overpass. Land uses include the Totem Lake Shopping Center commercial strip and larger buildings, including a parking garage to the east. There is some residential development on the west side of the freeway, but not as much as on the east side. The recent Kirkland Nickel Project improvements and the freeway are the predominant features. The total visual quality for this viewpoint is rated 2.1 out of 7, low. The primary viewer group is local roadway users.

NE 160th Street, facing northeast

Representative View D (see Exhibit 11 and Appendix C) looks north and east from the northbound I-405 ramp. Highway users are the primary viewer group and they are in a level position. Trees and multi-family residential development (Sonoma Villero Condominiums) are on the east side of the freeway in the foreground. Total visual quality is rated 2.7 out of 7, moderately low.

Sonoma Villero Condominiums

Representative View E (see Exhibit 11 and Appendix C) looks west toward the northbound ramp at NE 160th Street and onto I-405. There are currently medium and tall trees in the foreground between the condominium balconies and the northbound ramp that block most of I-405 and any possible background. The primary viewers are the condominium residents. The total visual quality for this viewpoint is rated 2.7 out of 7, moderately low.

SR 522/University of Washington – Bothell Campus

Representative View F (see Exhibit 12 and Appendix C) faces east from the college campus to the SR 522 / I-405 interchange. Wetlands and vegetation can be seen in the foreground along with vegetated hillsides in the middle ground. Some office/medical development in the distance is screened by trees. The dominant features are the vegetated wetland and the interchange. Within the study area this is the only representative viewpoint with a water feature. The total visual quality for this viewpoint is rated 4.6 out of 7, above average, mainly due to the wetlands and the hills (landform). The primary viewer groups are local roadway users, college students, and college staff.

Exhibit 10: I-405 at the NE 124th Street crossing (View C)

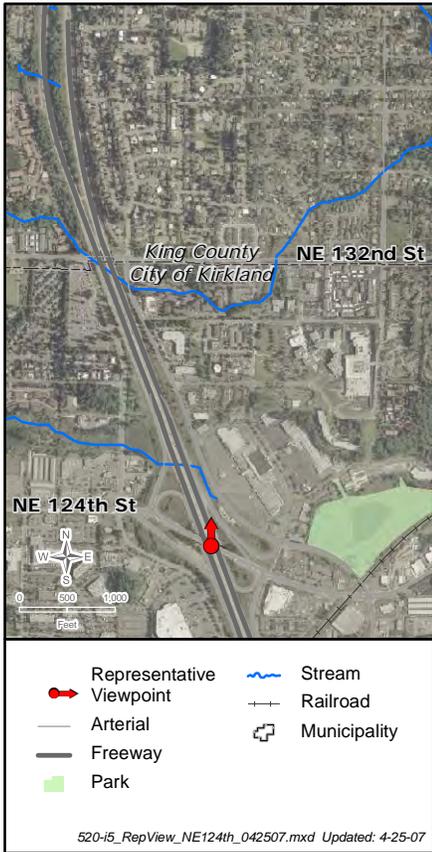
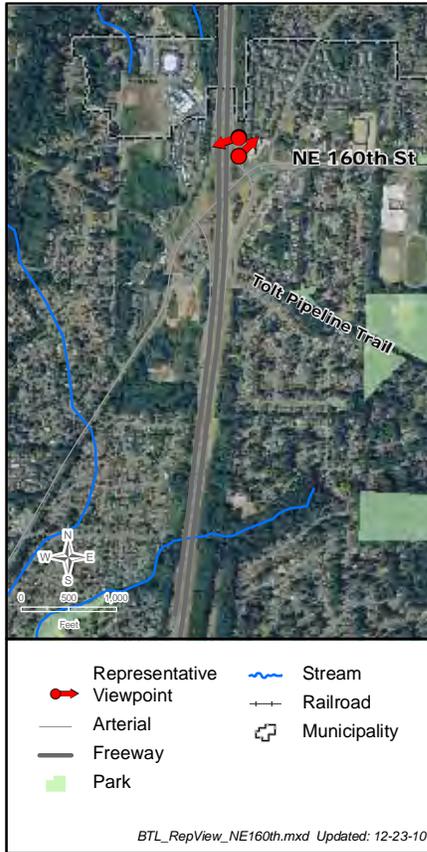


Exhibit 11: I-405 at the NE 124th Street crossing (Views D and E)



SR 527/I-405 interchange area

Representative View G (see Exhibit 13 and Appendix C) faces southeast from a commercial strip development to I-405. Mid-rise buildings are visible on the east side of the freeway with a vegetated ridgeline in the background. The freeway and a frontage road are the dominant features. The total visual quality for this viewpoint is rated 2.4 out of 7, low. The primary viewers are retail customers and drivers.

Exhibit 12: University of Washington – Bothell Campus (View F)



Exhibit 13: SR 527 / I-405 interchange area (View G)



Who will experience changes in visual quality and how sensitive are they to the changes?

Two primary viewer groups will experience changes in visual quality—highway users, who will experience views looking away from the project—and I-405 neighbors, who will experience views looking toward the project. Highway users will be commuters, local traffic, and other traffic. However, drivers will have a narrower field of view than passengers, as well as a reduced perception of views away from the immediate roadway in front of them. Typically, drivers are more sensitive to changes to the view of the roadway (e.g., lighting, signs, additional changes, barriers, etc.) and less sensitive to changes away from the roadway. Conversely, passengers are more sensitive to changes in the views of the areas surrounding the freeway. Overall, commuters are considered to have the lowest sensitivity to views looking away from the project; local traffic has a higher sensitivity than commuters; and other viewers have the highest sensitivity.

I-405 neighbors include local residents and users of the local transportation network and commercial, industrial, institutional (e.g., medical, educational), and recreational areas.

Residents may view the study area on a frequent (even daily) basis and generally have a strong sense of identity associated with the area in which they live or work. There are several parks near the I-405 corridor; however, the highway is generally obscured from most areas of these parks making park users unlikely to notice potential changes to I-405. Those who use the local transportation network may routinely be exposed to views of the areas affected by the project, such as in the local roads that cross I-405. These users are likely to be less sensitive to changes than local residents who have longer and more frequent exposures to views of the project.

POTENTIAL EFFECTS

What are the potential visual effects of the project?

Visual effects are measured by examining the degree of change to visual resources that will take place in relation to viewer response to that change. We can determine changes in visual resources by understanding changes in visual quality, using the representative key views; viewer response is determined from the sensitivities of viewer groups and the frequencies and durations of their exposures to the views. Visual effects are considered for both project construction and operation.

For the Bellevue to Lynnwood Improvement Project, overall visual quality effects will be minor. Most viewpoints will remain relatively unchanged once the proposed project is completed. Based on our analysis, two viewpoints decreased in their ratings. On a 7-point scale, one viewpoint score decreases from 2.7 to 2.2, and the other viewpoint score decreases from 2.7 to 2. The visual quality analysis categorizes a score of 2 as low visual quality, and a score of 3 as moderately low. The viewpoints remain in a low to moderately low score bracket (See Appendix B). Therefore, the overall visual quality effects for the I-405, 520 to I-5 Improvement Project are considered to be minor. The paragraphs below summarize the visual effects.

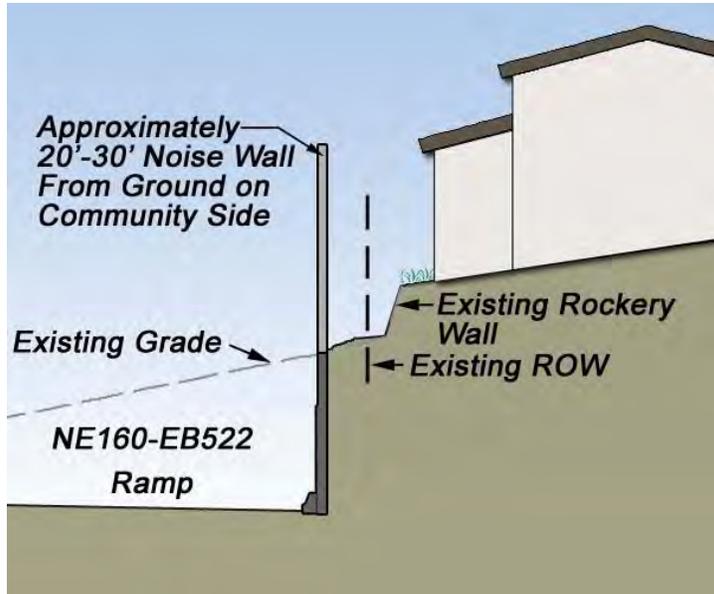
Representative Viewpoint D, NE 160th Street, facing northeast

Representative Viewpoint D (from the highway) looks northeast from the I-405 northbound ramp at NE 160th Street (see Exhibit 10 and Appendix C). The projected visual quality score for this viewpoint is 2.2 out of 7, a 0.5 decrease in score. The view currently includes a buffer and trees in the foreground and condominiums in the background. Although some trees will be taken from the buffer to build a retaining wall and a noise wall, these project elements will decrease the noise from the I-405 right-of-way. Visual quality scores for criteria like vegetation and encroachment will decrease. Since the development in that area is not unified, the new walls will not help to increase any natural or human-made unity. Therefore, the visual quality of that view will decrease slightly. Exhibits 15 and 16 show the exterior treatment for the walls at this viewpoint.

Representative Viewpoint E, Sonoma Villero Condominiums

Representative Viewpoint E (toward the highway) faces the northbound ramp to I-405 and I-405 at NE 160th Street (see Exhibit 8 and Appendix C). This is the view opposite Representative Viewpoint D. The projected visual quality score for this viewpoint is 2 out of 7, a 0.7 decrease in score due to the noise wall. The noise wall is anticipated to be 20 to 30 feet tall and may be less than 20 feet from condominium patios or doors. Exhibit 14 shows the concept for the noise and retaining walls at this viewpoint. Exhibits 15 and 16 show the finish for the noise wall that will be constructed at Representative Viewpoint E.

Exhibit 14: Cross section of noise wall and retaining wall at Sonoma Villero Condominiums



How will project construction temporarily affect visual quality?

The proposed project will create temporary visual effects for highway users and neighbors during construction. Construction activities will reduce the visual quality in the project area due to the presence of construction equipment, materials, signs, and staging areas. Temporary lighting will likely be used for nighttime construction of some project elements. Detours or lane shifts will require greater driver attention and will distract highway users from views outside of the construction areas. The primary visual effects will occur during clearing and grading activities. Given that a large portion of the study area has recently experienced construction effects from the Kirkland Nickel Project, continued construction activities will have minor visual quality effects.

Most of the residential areas to the east and west of the I-405 corridor are screened from the highway by a combination of vegetation, topography, and structures. Views of I-405 are limited and occur primarily at cross streets and associated interchanges, or local roads that are near the freeway. In some cases, existing noise walls will obscure the construction activity from surrounding areas.

The visual effects of construction will not change most views from I-405. Screening by topography, vegetation, and/or existing structures restricts most views to the foreground or middle ground. Where distant views are present, they will remain visible. Clearing of vegetation for construction will generally be limited to areas adjacent to the existing facilities.

How will the project operation affect visual resources?

The Bellevue to Lynnwood Improvement Project will not create adverse long-term visual effects for I-405 users and neighbors. Although some changes to the visual resources will occur, these changes are not substantial enough to alter the overall visual quality of the corridor or the rating scores of the representative viewpoints. Permanent effects of the project will be minor because viewer sensitivity is relatively low, and context-sensitive solutions (CSS) will be incorporated into the project.

The essence of CSS guidelines is that a proposed transportation project must be planned not only for its physical aspects as a facility serving specific transportation objectives, but also for its effects on aesthetic and environmental elements. CSS is discussed further in a following section on avoidance and minimization. I-405 is already a major freeway, and most of the improvements in the study area consist of added pavement or operational improvements within the existing right-of-way, which does not change substantially the visual quality. Exhibit B-2 (Appendix B) presents the project visual conditions with the project improvements.

The new noise walls have aesthetic treatments that were the outcome of the CSS process. They have a fractured fin pattern on the side facing the I-405 corridor and an ashlar pattern on the side facing the community. The fractured fin pattern is currently used on the existing noise walls along the I-405 corridor, and the use of the same pattern will ensure visual continuity throughout the corridor. The noise walls also incorporate an aesthetic post and cap treatment. Retaining walls will have aesthetic treatment similar to the noise walls. Exhibits 15 and 16 show an existing noise wall with CSS treatment from the community side and from the I-405 corridor side.

I-405 users will be exposed to increased human-made encroachment and complexity within the corridor, particularly where access ramps and overpasses dominate the view; however, these changes are slight when compared to the existing conditions. Portions of the project area where 20 feet or more of new pavement will be added are already the most highly developed, encroached-upon areas.

Additional project elements, such as signage, retaining walls, stripe buffers, gantries, and other structural elements, will be within the existing right-of-way, and, in many cases, within the existing screening of noise walls and vegetation. Exhibits 17 and 18 show what the express toll lanes and gantries might look like, including the buffer and signage for ingress/egress and tolling information. A gantry is a metal framework spanning toll lanes that may contain advance warning signs, signals, monitoring equipment, and electronic toll readers needed to communicate with the vehicle transponders. This is part of the technology that replaces a traditional toll plaza and enables in-motion, electronic toll collection. There will be approximately 34 tolling gantries and approximately 15 other toll sign structures.

Exhibit 15: View of noise wall from community side (ashlar pattern)



Exhibit 16: View of noise wall from I-405 corridor side (fractured fin pattern)



Exhibit 17: Simulation at NE 100th Street, demonstrating advance access signage



Exhibit 18: Simulation at NE 85th Street, facing north, demonstrating destination rate signage



Exhibit 19 shows a cross section of the northbound ramps from I-405 and NE 160th Street to SR 522. This is similar to the location shown in Exhibit 14. The retaining walls and elevated structure will have CSS treatment, as described above. Vegetation removal within the right-of-way to accommodate the additional general-purpose lanes will have a slight adverse effect on the visual environment. CSS techniques, such as landscaping and the use of aesthetically-pleasing designs for I-405 and related facilities, will enhance the attractiveness of the constructed environment and will alleviate minor effects to visual resources.

Exhibit 19: Cross section showing braided ramps to SR 522

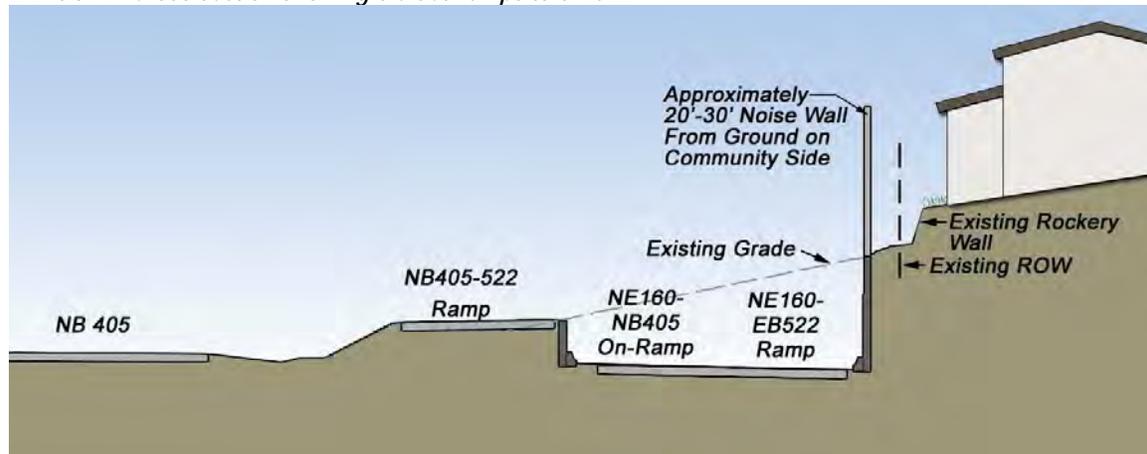


Exhibit B-3 (Appendix B) presents the visual quality effect determination used to assess the level of effects for the proposed project pertaining to the representative viewpoints. For these viewpoints, virtually no change will occur in visual quality.

Will the project create new sources of shadows, light, or glare?

Exposure to light generated by construction (illumination, headlights, and solar reflection) will increase during construction. This project will replace all impacted lighting and install approximately 200 new lights in the project area, mainly for the new express toll and HOV signs. All lights installed on I-405 will be 50 feet or less in height using cut-off fixtures, with lamps recessed into the light fixture. This configuration is designed to limit the amount of light that can spill outside the roadway area, resulting in reduced glare and light pollution. The new light poles will be painted to match the CSS standards — Cascade Green. Most residential areas are screened by vegetation, topography, and noise or retaining walls. The new lighting will be contained in the I-405 corridor; therefore, light and glare are expected to remain the same within the study area.

Does the project have other effects that could be delayed or will be distant from the project?

The Bellevue to Lynnwood Improvement Project has no other visual quality effects that could be delayed or distant from the project. This project will be constructed as one of

the later pieces in the overall I-405 Corridor Program schedule. Other effects from earlier phases, like the Kirkland Nickel Project, will already be in place and are considered in a separate analysis. Visual effects will be limited to the project area and surroundings.

Did we look at cumulative effects?

The I-405 team did not evaluate cumulative effects on visual quality. In accordance with Council on Environmental Quality (CEQ) guidelines, an analysis of cumulative effects is not needed for every discipline studied in NEPA documentation. Disciplines selected for cumulative effects analysis should be determined on a case-by-case basis early in the NEPA process, generally as part of early agency coordination and scoping. For the I-405, Bellevue to Lynnwood Improvement Project, the disciplines evaluated for cumulative effects were air quality, surface water, wetlands, and fish and aquatic habitat (Washington State Department of Transportation [WSDOT], 2010).

MEASURES TO AVOID OR MINIMIZE PROJECT EFFECTS

What are we doing to avoid or minimize project effects?

To address the type of disruption to the visual environment that will occur, light and glare effects will be reduced by shielding freeway lighting and using downcast lighting. The Bellevue to Lynnwood Improvement Project is being planned, developed, and designed in accordance with Context Sensitive Solutions (CSS) guidelines. These guidelines provide an approach that incorporates community values while meeting local, regional, and national requirements for the safe, efficient, and effective movement of people and goods. CSS considers the elements of mobility, safety, environment, and aesthetics throughout the project. To adhere to these guidelines, the proposed project is being developed to fit its physical surroundings and preserve these elements.

The application of CSS guidelines reduces the need for additional mitigation of visual effects. The Bellevue to Lynnwood Improvement Project will consider community input during development to ensure that local concerns are met early in the project planning and design phases. Measures that are typical for transportation projects, such as retaining existing natural vegetation to the maximum extent practical, and planting new vegetation to screen constructed elements, have been incorporated within the CSS of I-405 and related transportation features. Other areas subject to CSS include structural elements, landscape features, lighting, signs, and special elements such as parking structures and pedestrian bridges.

UNAVOIDABLE ADVERSE EFFECTS

What are we doing to minimize unavoidable adverse effects?

The project will not cause any adverse affects that cannot be avoided. The effects of project construction and operation are minor, as discussed earlier in this technical memorandum. While the average overall visual quality rating in the project area decreased slightly from 2.95 to 2.7 on a 7-point scale, the visual quality remains moderately low to low, as assessed in the baseline conditions.

ACRONYMS AND ABBREVIATIONS

Term	Acronym
CSS	context-sensitive solutions
DEA	David Evans and Associates
EIS	environmental impact statement
FHWA	Federal Highway Administration
GIS	geographic information system
HOT	high-occupancy toll
HOV	high-occupancy vehicle
NEPA	National Environmental Policy Act
RCW	Revised Code of Washington
ROW	right-of-way
SOV	single-occupant vehicle
SR	state route
WSDOT	Washington State Department of Transportation

GLOSSARY

Word	Visual quality assessment definitions	Meaning
context-sensitive solutions (CSS)	Context sensitive solutions (CSS) is a collaborative, interdisciplinary approach to develop a transportation facility that fits its physical surroundings and is responsive to the community's scenic, aesthetic, social, economic, historic, and environmental values and resources, while maintaining safety and mobility.	CSS is an approach that considers the total context within which a transportation improvement project will exist.
continuity	The uninterrupted flow of visual pattern elements, e.g., the maintenance of visual relationships between related landscape components or features.	A view with high continuity has an uninterrupted visual pattern. A view with low continuity has one or more elements (colors, forms, lines, etc.) that disrupt the visual pattern.
de minimus effect	An effect so small that it is insignificant.	
distance zones (foreground, middle ground, background)	Three conventional terms in painting (foreground, middle ground, background) which can be helpful in describing distance relationships.	<p>Foreground: In a visual analysis, this distance zone is where the viewer has impressions of immediate details and intensity of color is at a maximum. This area can be designated with clarity and simplicity not possible for the middleground and background because the observer is a direct participant (0 to 0.25 mile).</p> <p>Middleground: In a visual analysis, this distance zone is where the parts of the landscape can be seen to join together, where hills become a range or trees make a forest. This is also where manmade changes may be revealed as resting upon the landscape, or where conflicts of form, color, shape, or scale show up (0.25 to 1.0 mile).</p>
		<p>Foreground is what viewers see relatively close. Detail and color are clear. For example, a single tree may stand out as a key element of the landscape. Viewers are often highly sensitive to changes to the visual quality of the foreground.</p> <p>Middleground is farther away than the foreground. In the middleground, smaller details are lost as the larger picture takes form. Colors and contrasts are clear, but less sharp than in the foreground. Single trees are less likely to stand out – instead, the viewer sees a woodland or forest.</p>

Word	Visual quality assessment definitions	Meaning
	<p>Background: In a visual analysis, this distance zone is where surfaces of landforms lose detail distinctions and the emphasis is on outline or edge. The background becomes an effective backdrop against which foreground and middleground is more clearly seen (>1.0 mile).</p>	<p>Background is the distance view. Forms in the view blend together. Edges and outlines, rather than details, are seen. Colors become softer and more muted. Individual trees can no longer be seen, and the woodland or forest becomes a “green mass.”</p>
<p>high-occupancy vehicle</p>	<p>High-occupancy vehicle is a special designation for a bus, carpool, or vanpool provided as an encouragement to increase ride-sharing. Specially designated HOV lanes and parking are among the incentives for persons to pool trips, use fewer vehicles, and make the transportation system more efficient. HOV lanes are generally inside (left-side) lanes, and are identified by signs and a diamond on the pavement. Currently, two or more (2+) occupants are required to use the I-405 HOV lanes. Motorcycles are allowed to use freeway HOV lanes as well.</p>	
<p>intactness</p>	<p>The visual integrity of the natural and human-built landscape and its freedom from encroaching elements. High intactness means that the landscape is free of eyesores and is not broken up by features that are out of place.</p>	<p>A landscape is considered “intact” where the visual elements fit together in size, shape, color, and position without other elements encroaching – where nothing looks out of place. An intact landscape can be natural, manmade, or a combination of the two.</p>
<p>landscape cover</p>	<p>This refers to what is on top of the land. For example, the landscape cover of a hillside may be vegetative (forested, brush, grass, etc) or manmade (urban, suburban, industrial, etc.). Subcategories of landscape cover types are defined as necessary.</p>	
<p>landscape form, landform</p>	<p>A defined topographic feature, such as an island, specific hill, or range of hills.</p>	
<p>landscape type</p>	<p>Similar combinations of landscape form and landscape cover. Forested plateaus, valley bottom farmlands, and wooded bluffs are all landscape types. There are also manmade landscape types, such as strip development along urban roadways.</p>	

Word	Visual quality assessment definitions	Meaning
landscape unit	Places or districts with clear landform or landcover boundaries that form an outdoor area with similar visual character and visual continuity. For example, a landscape unit can be a single neighborhood, or several neighborhoods combined.	
local values and goals	The landscape setting and its visual resources may be valued by local viewer groups for reasons not evident in an assessment based strictly on visual resources and not widely known outside the community.	A visual quality assessment should consider local values in addition to the technical evaluations of what can be seen.
observer viewpoint	A point from which a select view is evaluated.	A viewpoint is simply where people are located when they see something. Within this assessment, a viewpoint is used to indicate where photographs are taken to represent views characteristic of what many people in the area will see.
scale	Within the context of a visual analysis, the apparent size relationships between landscape components or features and their surroundings.	The relative size of what is seen.
semi-urban landscape	Landscape characterized by intermixed built and natural or naturalized elements, with built elements prevailing.	Used to characterize a landscape unit or a characterization from the WSDOT Roadside Classification Manual.
sightline	An imaginary straight line between a person's eyes and a distant object.	
slope	The change in elevation over a distance, or an inclined land form.	An area of landform surface differentiated from other areas by its degree of slope. It is a component of landforms but not limited in place or extent. Example may include a cliff, gentle slopes, and flat plain.
topography	The physical features of a geographic area taken collectively; especially, the variations in elevation of the earth's surface.	

Word	Visual quality assessment definitions	Meaning
transportation facility	Roadways, access ramps, noise walls, retaining walls, traffic barriers, transit stations, park-and-ride structures, non-motorized facilities, signage, lighting, stormwater treatment and conveyance, and landscaping within the project area.	
unity	The visual coherence and compositional harmony of the landscape when considered as a whole. High unity frequently reflects the careful design of individual human components and their relationship in the landscape.	The degree to which the visual resources of the landscape join together to form a coherent, harmonious visual pattern. Unity refers to the compositional harmony or inter-compatibility between landscape elements.
urban landscape	A landscape characterized predominantly by built elements.	
view	That which can be seen either from or toward the transportation facility.	Views are narrowed down to representative viewpoints for analysis.
viewer awareness	The degree to which a viewer notices the landscape.	A viewer's receptivity to the visual character of the landscape can be affected by elements and relationships in the landscape setting itself or by expectations about the setting. Visual experience contrary to expectation may be suppressed or heightened, depending on the degree of disagreement.
viewer exposure	How many people see something from a particular viewpoint and over what duration they see it. View duration considers how often viewers observe the view, the frequency of views, and whether the viewers or the objects are stationary or moving.	
viewer groups	Groups of people who are differentiated from others by their viewing characteristics or visual response to a landscape feature. For example, local park users are one class of viewer, and are likely to have a different visual response to a landscape feature than people viewing the same feature from an industrial setting.	Classes of viewers differentiated by their visual response to the I-405 facility and its setting; response is affected by viewer activity, awareness, and values.

Word	Visual quality assessment definitions	Meaning
viewer response	A positive or negative measure of how people react to changes in what they see.	Factors affecting how a viewer responds to change in visual resources include viewer exposure, viewer sensitivity, cultural significance, and local values.
viewer sensitivity	The degree to which people respond to what they see. A viewer with high sensitivity to a particular view will respond strongly to any change in the view. Viewer sensitivity does not imply support for or opposition to a proposed change in the view.	The viewer's variable receptivity to the elements within the environment that he/she is viewing, affected by viewer activity and awareness. A person cannot readily notice every object and all the attributes of the objects that compose the total visual environment.
viewshed	The area that can be seen from a given viewpoint or group of viewpoints; it is also that area from which that viewpoint or group of viewpoints can be seen.	
visual assessment unit	The visible portion of the landscape unit that contains the transportation facility.	A portion of the area visible or potentially visible from a highway project or from which the highway project may be seen; to be useful in visual assessment, it should be identified on the basis of visual distinctions, such as landscape unit boundaries.
visual character	The visual patterns formed by everything that can be seen and how those patterns fit together in the visible landscape. The description of character considers dominance, scale, diversity, and continuity to further define the visible landscape.	The visual character of a landscape is formed by the order of the patterns composing it. The elements of these patterns are the form, color, line, and texture of the landscape's visual resources. Their inter-relationships can be objectively described in terms of dominance, diversity, continuity, and so on.
visual corridor	The changing views along the facility experienced by users.	A continuous succession of visually and spatially distinct experiences.
visual effect	The degree of change in visual resources and the viewer response to those changes caused by facility development and operations.	A combination of the change in visual resources and people's response to the change.

Word	Visual quality assessment definitions	Meaning
visual quality	A subjective measure of the character of the visual resource. The many factors that contribute to a landscape's visual quality are grouped under intactness, unity, and vividness.	
visual resources	The collection of all features and things that can be seen in an area.	The appearance of the features that make up the visible landscape. Includes land, water, vegetative, animal, and other features that are visible.
vividness	Describes how the landscape elements combine to form a colorful, striking, or otherwise memorable composition.	The memorability of the visual impression received from contrasting landscape elements as they combine to form a striking and distinctive visual pattern.
windshield survey	The process of driving by an area to look at properties for general housekeeping and verify property addresses; a method of observing a study area by driving the area in a vehicle.	Basic method for "field reconnaissance" to narrow down representative viewpoints for analysis.

REFERENCES

GIS data sources

Exhibit 5

Puget Sound LiDAR Consortium, LiDAR, 2002.

http://pugetsoundlidar.ess.washington.edu/About_PSLC.htm

HDR. 2006 - 2007. Viewshed.

Exhibit 6

HDR. 2006 – 2007. Viewpoint.

Exhibit 7

David Evans & Associates. 2001. I-405 Corridor Program Visual Resources Expertise Report prepared for the WSDOT I-405 Corridor Program. Updated 2007 by HDR; Landscape Unit.

Puget Sound LiDAR Consortium, LiDAR, 2002.

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Exhibits 8 through 12

HDR. 2006 – 2007. Viewpoint.

Base data

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2005. Trails in King County. Data updated by I-405 staff to match fieldwork, 2002 LiDAR and orthorectified aerial photography.

USGS (United States Geological Survey). June 2002. Color Aerial Photography.

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WSDOT (Washington State Department of Transportation), Spatial Data Catalog, 2006, City Limits.

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WSDOT (Washington State Department of Transportation). 2010. I-405, Bellevue to Lynnwood Improvement Project; Cumulative Effects Analysis Technical Memorandum.

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APPENDIX A DETAILED STUDY APPROACH

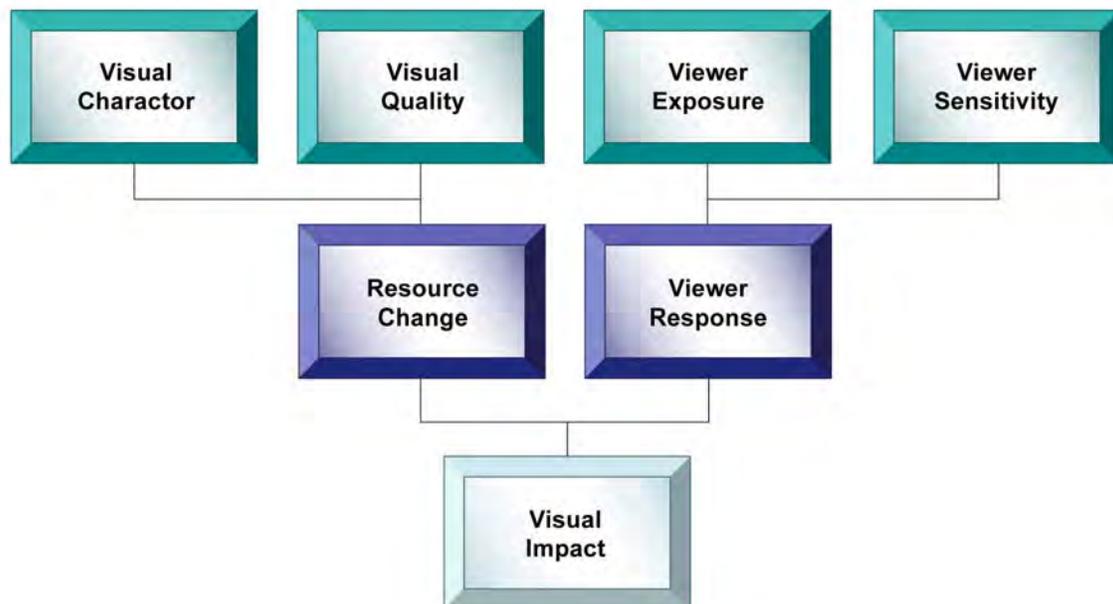
What tools and vocabulary did we use for this assessment?

Tools used for this assessment included:

- GIS to determine the topographic viewshed;
- Field reconnaissance and observation of the study area to determine visible areas and representative views from and toward I-405;
- The Visual Quality Rating Matrix (see Appendix B), based on the Federal Highway Administration's (FHWA) *Visual Impact Assessment for Highway Projects* manual (FHWA-HI-88-054) (FHWA, 1981);
- Photographs from within the viewsheds (see Appendix C);
- Design information to determine the project-related changes and visual effects.

The vocabulary used in the assessment follows the FHWA Visual Impact Assessment manual (FHWA, 1981). As noted above, we evaluate visual resources by examining *visual character* and *visual quality* to determine *resource changes*, and by assessing *viewer exposure* and *viewer sensitivities* to determine *viewer response*. *Resource change* and *viewer response* are, in turn, used to determine visual quality effects of the project. The visual assessment approach and the relationship of these elements are shown below.

Exhibit A-1: Visual assessment approach



Visual character

Visual character refers to the visual patterns formed by everything that can be seen and how those patterns fit together in the visible landscape. The affected visual environment contains landscape components that include topographic features (e.g., mountains, valleys) and land cover. Land cover includes water, vegetation, and the built environment. We can categorize these components in distinctive landscape character units based on patterns created by dominance, scale, diversity, and continuity of elements in the landscape. *Dominance* refers to the position of an individual element or its extent or contrast in relation to other elements. *Scale* refers to apparent size relationships between an element and its surroundings. *Diversity* is a function of the number, variety, and intermixing of elements in a view. *Continuity* refers to the maintenance of visual relationships between connected or related landscape features.

The *viewshed analysis* defines the physical limits of the visual resources that can be affected by the project. The *topographic viewshed* is the visible area without regard for screening effects from vegetation or structures. The viewshed is the area from which the project can be seen and the area that can be seen from the project. The basis for the analysis is a simple line-of-sight determination based solely on topography. This unobstructed line-of-sight determination is applicable for views from the road and views toward the road. The *existing viewshed* is the visible area including the screening effects of vegetation and structures.

Visual quality

We can determine the visual quality of the affected environment by analyzing the landscape using a set of proven evaluative measures to assess three components of visual quality: *vividness*, *intactness*, and *unity*. These measures are used to evaluate visual quality of key viewpoints.

Vividness describes the way landscape components combine in distinctive and memorable visual patterns. Four aspects of vividness can affect the landscape: topography, water, vegetation, and constructed elements. The distinctiveness or quality of a specific element within a landscape scene defines this element. Vividness is ranked on a scale of 1 to 7, with a rating of 7 indicating a high (desirable) degree of vividness.

Intactness measures the visual integrity of the natural and human-made landscape and its freedom from encroaching elements. High intactness means a landscape is highly natural and free of eyesores, or is not broken up by features that are out of place. Intactness is subdivided into two categories: the level of human-made development and the degree of encroachment. A rating of 7 indicates a landscape that is highly intact and contains no encroachments.

Unity describes the visual coherence and compositional harmony of the landscape considered as a whole. It refers to the fit between elements of the landscape, but does

not connote uniformity in design or character. One aspect of this criterion is the unity between constructed and natural pattern elements, which usually attests to the careful design of individual components in the landscape. Unity is ranked on a scale of 1 to 7, with 7 representing a landscape with a coherent, harmonious visual pattern (desirable).

An overall visual quality ranking is determined by taking a numerical average of the three rankings for vividness, intactness, and unity.

Viewers

Viewer analysis considers who will see the visual resources of the project area and the changes that will result, as well as the circumstances under which the viewer sees them.

Location is a key factor in viewer analysis. Viewer location is evaluated in terms of where the viewpoint is relative to the visual resource. The view position is described as superior (above, or looking down at, the resource), normal (level with the resource), or inferior (below, or looking up at, the resource). An example for superior may be a view from an overpass or pedestrian bridge, a normal view might be from the road, and an inferior view might be from a park or trail at a lower elevation. The distance of visual resources observed from a viewpoint is characterized as foreground, middle ground, and background.

The duration of viewer exposure considers *how long* a viewer is exposed to a view during a single instance (examples might include an individual making his morning commute to work or an individual looking out the window from her residence). The view of a commuter on I-405 may be relatively brief, while that of a resident may be longer. The frequency of viewing considers *how often* viewers are exposed to a view.

Perceptions of the visual environment vary among viewer groups. This variable perception is referred to as *viewer sensitivity*, and it is influenced by viewers' visual preferences and the circumstances under which they encounter a view. Viewer activities, such as driving in heavy traffic on a daily basis, may distract viewers or desensitize them to much of the visual environment. Viewer awareness can be heightened by encountering a visual change, such as entering an urban area or encountering a dramatic view of water or a mountain.

Visual resource change

Visual resource change evaluates the degree of change in a visual resource without regard to viewer response. Therefore, we first identify project-related changes to views, then evaluate the visual quality of the view in relation to those changes (using the same three measures in evaluating the view's existing condition: vividness, intactness, and unity). We use a visual quality ranking matrix to compare the visual quality of the view with and without the project, allowing the change to be expressed as the difference between the two. The change, combined with the viewer sensitivity for a particular area and project result in a high, medium, or low visual effect. A standard baseline, like an

undeveloped forest, for example, is not used. The visual effect, like the scoring in the field, is assigned relative to the baseline and the projected changes in the project area.

Viewer response

Viewer response is the evaluation of how viewers respond to the changes in visual resources. For the I-405, Bellevue to Lynnwood Improvement Project, we categorized viewers as I-405 users (views from the project) and I-405 neighbors (views toward the project).

APPENDIX B VISUAL QUALITY RATING MATRIX

Exhibit B-1: Visual quality analysis – baseline conditions

Representative Viewpoints		A. NE 60th Street I-405 facing south	B. NE 60th Street I-405 facing north	C. NE 124th Street facing north	D. NE 160th Street facing northeast	E. Sonoma Villero Condominiums facing west	F. SR 522 (UW Bothell) facing east	G. SR 527 Interchange facing east
Viewer Orientation	To the Highway			X		X	X	X
	From the Highway	X	X		X			
View Distance	Foreground	X	X	X	X	X	X	X
	Middle ground	X		X			X	X
	Background						X	X
Viewer Position	Inferior							
	Normal	X	X		X	X	X	X
	Superior			X				
Vividness	Landform	3	3	2	2	2	5	2
	Water	NA	NA	NA	NA	NA	5	NA
	Vegetation	2	2	1	3	4	5	3
	Human-made	3	3	2	3	3	4	3
	Average	2.7	2.7	1.7	2.7	3	4.8	2.7
Intactness	Development	2	2	3	3	3	4	2
	Encroachment	3	3	2	4	3	4	3
	Average	2.5	2.5	2.5	3.5	3	4.0	2.5
Unity		3	3	2	2	2	5	2
Total Visual Quality		2.7	2.7	2.1	2.7	2.7	4.6	2.4

7 = very high; 6 = high; 5 = moderately high; 4 = average; 3 = moderately low; 2 = low; 1 = very low.

Exhibit B-2: Visual quality analysis – projected conditions

Representative Viewpoints		A. NE 60th Street I-405 facing south	B. NE 60th Street I-405 facing north	C. NE 124th Street facing north	D. NE 160th Street facing northeast	E. Sonoma Villero Condominiums facing west	F. SR 522 (UW Bothell) facing east	G. SR 527 Interchange facing east
Viewer orientation	Toward the highway			X		X	X	X
	From the highway	X	X		X			
View distance	Foreground	X	X	X	X	X	X	X
	Middleground	X		X			X	X
	Background						X	X
Viewer position	Inferior							
	Normal	X	X		X	X	X	X
	Superior			X				
Vividness	Landform	3	3	2	1	2	5	2
	Water	NA	NA	NA	NA	NA	5	NA
	Vegetation	2	2	1	2	2	5	3
	Human-made	3	3	2	2	2	4	3
	Average	2.7	2.7	1.7	1.7	2	4.8	2.7
Intactness	Development	2	2	3	3	2	4	2
	Encroachment	3	3	2	3	2	4	3
	Average	2.5	2.5	2.5	3	2	4.0	2.5
Unity		3	3	2	2	2	5	2
Total Visual Quality		2.7	2.7	2.1	2.2	2	4.6	2.4

7 = very high; 6 = high; 5 = moderately high; 4 = average; 3 = moderately low; 2 = low; 1 = very low.

Exhibit B-3: Visual quality effects determination

Viewpoint	Baseline visual quality	Projected visual quality	Degree of visual change	Primary viewer groups	Number of viewers	Viewer sensitivity	Type/duration of exposure	Visual effect
A. NE 60th Street I-405, facing south	2.7	2.7	0	Highway users	High		Short	
B. NE 60th Street I-405, facing north	2.7	2.7	0	Highway users	High	Low	Short	Low
C. NE 124th Street, facing north	2.1	2.1	0	Local roadway users	High ^{Low}	Low	Short ^{Low}	Low
D. NE 160th Street, facing northeast	2.7	2.2	-0.5	Highway users	High	Low	Short	Low
E. Sonoma Villero Condominiums, facing west	2.7	2	-0.7	Condominium residents	Low	High	Long	Medium
F. SR 522 (UW Bothell), facing east	4.6	4.6	0	Local roadway users, college students, and staff	Moderate	High	Medium	Low
G. SR 527 Interchange, facing east	2.4	2.4	0	Retail customers and local roadway users	Moderate	Medium	Medium	Low

7 = very high; 6 = high; 5 = moderately high; 4 = average; 3 = moderately low; 2 = low; 1 = very low.

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APPENDIX C REPRESENTATIVE VIEWS

Representative View A: NE 60th Street at I-405, view facing south



Representative View B: NE 60th Street at I-405, view facing north



Representative View C: NE 124th Street, view facing north



Approaching Representative View D: NE 160th Street northbound ramp to I-405, view facing northeast



Representative View D: NE 160th Street northbound ramp to I-405, view facing northeast



Representative View E: Sonoma Villero Condominiums, view facing west



Representative View E: Sonoma Villero Condominiums, view facing west



View F: SR 522 (UW Bothell), view facing east



Representative View G: SR 527 interchange, view facing east

