

4.0 Environmental Consequences

4.1 Introduction

NEPA mandates that environmental assessments disclose the environmental impacts of a proposed federal action. In this case, the proposed federal action is the implementation of the Master Site Plan for the Federal Center. This chapter analyzes the potential effects of the management alternatives on range of resources identified in Chapter 3.

The EIS should be considered a programmatic document. The alternatives provide broad management direction, and only allow for the potential consequences of the alternatives to be analyzed in general terms. Prior to undertaking specific actions as a result of the Master Site Plan, GSA will determine whether more detailed environmental documents will need to be prepared, such as environmental assessments or related studies, that will tier off of this EIS, consistent with the provisions of NEPA.

The first part of this chapter discusses policy and terminology related to cumulative impacts and impairment of resources, while the second part discusses methods that the planning team used to identify impacts, including definitions of terms. The alternatives are then analyzed by resource topic in the order they appear in Chapter 4. Each impact topic includes a description of the positive and negative effects of the alternative, a discussion of cumulative effects, and a conclusion.

At the end of the discussion for each alternative, there is a brief discussion of the relationship between short-term uses and long-term productivity, irreversible or irretrievable commitments of resources, and unavoidable adverse effects.

Chapter 4 presents an evaluation of the proposed actions so that potential impacts to existing environmental resources can be determined and mitigation measures that would avoid, reduce, or offset identified impacts resulting from implementation of the Master Site Plan can be recommended. Direct and indirect impacts would be associated with changes to the Federal Center site, indirect impacts would occur in the surrounding area, and cumulative impacts would result from this and other development projects that have been proposed in the area.

4.2 Development of No Action Alternative

Section 1502.14(d) of NEPA requires that alternative analysis in an EIS include a No Action Alternative. Under the No Action Alternative, GSA would continue the implementation of the outline from the 1997 Master Site Plan.

Were the No Action Alternative selected for implementation, existing conditions and trends that are described for the affected environment in Chapter 3 of this document would continue. As a result, the project purpose and need described in Chapter 1 would not be met.

In many respects, the No Action Alternative examined in this EIS is a mirror of the No Action Alternative described in the 1997 Master Site Plan. In summary, the 1997 Master Site Plan sought to provide GSA with the flexibility to accommodate a range of possible futures activities (GSA 1997b). Development thresholds were identified to establish possible future level-of-uses. The resulting concepts represented options for the overall utilization of the Federal Center taking into account the physical capabilities, the financial/economic constraints, and the range of potential development thresholds.

The five general aspects incorporated in 1997, circulation, access, growth areas, open space, and security, were the same considered in current Master Site Plan, including the common components of maintenance of the central core area and retention of open space areas. The environmental analysis completed in 1997 was based on the “worse case scenario” that the Moderate Growth development threshold would have the greatest potential for impacts. Approaches for addressing the five general aspects were the same in both the 1997 and 2007 Master Site Plans and accompanying EISs, and were focused on qualitative rather than quantitative perspectives.

Under the 1997 Master Site Plan, expansion of the Federal Center was to occur in three development districts. Stage I development would only occur within specified undeveloped portions of the central core area. Stage II and Stage III development would occur outside the central core area where large areas of open land could be developed without adversely affecting essential open space or the denser central core area. It was assumed that 75 percent of the growth would occur in the Stage I district under the Moderate Growth development threshold. Moreover, during the life of the 1997 plan, growth outside the core area would be limited to mixed-use development within the Stage II district and last-priority development within Stage III.

Open space under the 1997 Master Site Plan was anticipated to constitute almost 40 percent of the total available area of the Federal Center. McIntyre Gulch and the Agricultural Ditch and much of the northern portion of the site along Sixth Avenue, east along Kipling Street, and in the southwestern and southeastern corners were anticipated to be maintained as natural corridors and connections to open space as well as undeveloped parcels.

Accomplishments of the 1997 Master Site Plan include the siting and construction of the Solar Park in 2007 (Stage III) along the northern edge of the site, next to 6th Avenue, and the removal of 19 of 20 buildings that were recommended for removal by 2005. Conversely, the expansion of the Federal Center under Stages I and II was not realized, nor was Gate #1, one of the main portals to the site, realigned to just south of Downing Reservoir to minimize traffic congestion on Alameda Avenue. The recent sale of 65 acres by GSA to the City of Lakewood for further development by St. Anthony and RTD was not anticipated in the 1997 Master Site Plan, but it constitutes a significant change in the existing conditions for the Federal Center.

The No Action information provided in this subsection is augmented by the resource-specific discussions provided under the No Action subheading under each resource topic.

4.3 Selection of the Preferred Alternative

The two most often received comments during the public comment period for the DEIS referred to the desire for a maximum amount of open space and concerns regarding development, especially in the southeastern corner of the site. Security was a topic of import as well. Chapter 1 discusses the common or overarching aspects of the desires to have an accessible site as well as one that provides the necessary security for tenants. GSA sought another location for housing that would concentrate any short-term impacts as well as allow more land left for a range of open space uses. GSA looked to the northwestern section of the site as a location that would put any housing in close proximity to the Office and Mixed Use districts and RTD Intermodal Station.

Movement of the housing development option under the Federal Quad Alternative allowed the southeastern corner to remain a more urban open space. These adjustments to the Quad Alternative provided a better balance of uses that support the tenant community as well as recognize the interdependence of the larger community's needs within the surrounding neighborhood. Based on public comments and the changes to protect open space and support the transit-oriented area, the Quad Alternative was selected as the Preferred Alternative.

4.4 General Methods and Assumptions for Analyzing Impacts

This section presents the methods used to conduct the environmental impact analyses. Each resource topic area includes a discussion of impacts, including the *intensity*, *duration*, and *type* of impact. Impact *intensity* considers whether the impact would be negligible, minor, moderate, or major. Impact *duration* considers whether the impact would occur in the short-term or long-term. Although the period definition depends upon resource recovery times, short-term often refers to less than 1 year and long-term to more than 1 year. Short-term impacts are those that, within a short period of time, would no longer be detectable as the resource returns to its pre-disturbance condition or appearance. Long-term impacts refer to a change in a resource or its condition that is expected to persist for a longer period of time.

The *type* of impact refers to whether the impact on the environment would be beneficial or adverse as well as direct or indirect as described below:

- Beneficial—A positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition
- Adverse—A change that declines, degrades, and /or moves the resource away from a desired condition or detracts from its appearance or condition
- Direct—An effect that is caused by an action and occurs in the same time and place
- Indirect—An effect that is caused by an action, but occurs later in time or is farther removed in distance, and is still reasonably foreseeable

The impact analyses for the No Action Alternative compare resource conditions 15 to 20 years in the future with current conditions. The impact analyses for the action alternatives,

the Federal Quad and Federal Mall, compare conditions 15 to 20 years in the future under the action alternative with conditions 15 to 20 years in the future under the No Action. In other words, the impacts of the action alternatives describe the difference between implementing the No Action and implementing either the Federal Quad Alternative or the Federal Mall Alternative. To understand the consequences of any action alternative, what would happen if no action were taken must also be considered. Unless otherwise indicated, the methods, assumptions, and definition of terms described in this section apply to each resource topic discussion that follows.

4.5 Land Use Impacts

The general methods, assumption, and definition of terms described in Subsection 4.4 apply to this resource topic.

Land use impacts that can be attributed to implementation of the Master Site Plan project are determined by changes to the site and the surrounding area, including changes in density and use, induced development, spurred revitalization, or increased vacancy. Such changes can be a function of the scale of the proposed development, the types of adjacent land uses, the presence of underutilized or vacant land, and pressures from outside development forces. In the following analysis, direct land use impacts are based on physical changes to the Federal Center site as well as changes in the uses within certain portions of the site. Indirect land use impacts generally include commercial, retail, and residential land use changes that occur outside of the Federal Center site in the surrounding area. Cumulative land use impacts are the result of the implementation of the proposed Master Site Plan, together with other projects occurring in proximity to the site.

In general, implementation of the preferred alternative ~~proposed action~~ would result in additional development within the Federal Center site. However, under both Master Site Plan alternatives, the amount of designated, usable open space would also increase as portions of the Federal Center site become more open and accessible for active and passive uses. Improvements to the Federal Center would also have the potential to increase development in the surrounding areas. Because the Federal Center site has been off limits to developers for more than 50 years, the Denver metropolitan area has grown around the site and continued on to the west, leaving the Federal Center site surrounded by substantial density, and creating latent demand on the subject property across multiple land use types.

Improvements to the site could potentially attract new development to the area. The site comprises four “hard corners” that are especially attractive to retail development. These corners include the junctions of Alameda Avenue, Kipling Street, Union Boulevard, and U.S. Highway 6 (6th Avenue). Easy access to downtown Denver and the suburban areas to the west via Alameda Avenue and 6th Avenue make the site attractive as a location for residential development, particularly higher density products.

Improvements to the Federal Center would serve tenants, allowing for a more optimal physical distribution of facilities, accommodating for employment growth and expansion among existing tenants, and providing a more attractive menu of space to attract other federal tenants currently operating offsite. As a major employment base, the Federal Center site

provides additional appeal to private-sector developers of retail, high-density residential, as well as complementary office and research space. Because of the special security/access requirements of many of its tenants and its unique mix of land use types, however, the Federal Center site presents certain constraints to any efforts at “highest and best use” development. Overall, the Federal Center site is well positioned to capture a significant share of trade area demand potential across all major land use types. Table 4-1 is a summary of land use by alternative.

TABLE 4-1:
 Summary of Land Use by Alternatives

Land Use	Quad	Mall
Office (sf)	800,000	950,000
Research and Development (sf)	633,000	446,500
Retail (new sf)	212,000	250,000
Federal (new sf)	1,800,000	2,000,000
Federal (existing sf to be retained)	2,837,000	2,876,330
Lodging (sf)	200,000	200,000
Total	6,482,000	6,722,830
Residential (units)	290 1,400	1,400

sf square feet

4.5.1 Federal Quad Alternative—Preferred Alternative

Concurrent with the review of comments received on the Draft Master Site Plan and DEIS, GSA began the process of examining the range of alternatives for selection of a preferred alternative. GSA examined the purpose and need identified at the beginning of the planning process, the vision developed in conjunction with a range of stakeholders, public comments, consultations, and laws and policies.

The two most often received comments referred to the desire for a maximum amount of open space and concerns regarding development, especially in the southeastern corner of the site. Based on public comments and the changes to protect open space and support the transit-oriented area, the Federal Quad Alternative was selected as the preferred alternative. This plan is shown in Exhibit 2-2.

4.5.1.1 Retail, Residential, and Office Space Uses

Under the Federal Quad Alternative, the Federal Center site would be organized into a series of distinct functional areas. An elliptical park, the Quad, would form the center of the new development, replacing the buildings, parking, and roadways within the western end of the existing core area. A well-organized series of mid-rise buildings would surround the Quad and include 1.8 million square feet of new federal space on the Federal Center site in the Federal Campus and Federal Quad districts. This new federal space would include a mix of uses such as office and supporting uses, including laboratories, R&D space, and industrial

flex space. The Quad would be connected to the future transit station by an urban street, anchored at one end by the station and at the other by a signature federal building. North, east, and south of the Quad, existing federal office space would be maintained in a number of medium- to large-size buildings, forming two other federal campus areas.

West of the Quad, the Mixed-Use Core would contain a combination of retail, residential, office space, and, potentially, a hotel. It would be located in an area that is currently underutilized, containing a series of medium- to small-size buildings haphazardly placed within an open landscape. The Mixed-Use Core would be located adjacent to the transit station and the RTD rail line and would generally be higher in density than surrounding development. The total number of residential units proposed would be ~~290~~1,400, while the hotel would accommodate 200 rooms for visitors to the Federal Center district.

North of the transit station and RTD rail line, the Office Center district would provide 400,000 square feet of new commercial office space and 200,000 square feet of new research and development space. The proximity to transit, parks, and retail uses, as well as its visibility on 6th Avenue and Union Boulevard, make this location well-suited for commercial use. This area currently contains a series of underutilized grassy parcels bisected by roadways and dotted with small buildings.

South of Center Avenue and the Mixed-Use Core district, an R&D district providing 233,000 square feet of space would accommodate federal users, or private-sector users, that need light industrial space in proximity to federal agencies. The area currently contains a series of small- to mid-size buildings and associated parking. The district would be connected to the Quad by Center Avenue, a wide, tree-lined boulevard.

A neighborhood retail district would be created around the existing U.S. post office at Alameda Avenue and 7th Street. This retail district would strengthen connections between the Federal Center site and adjacent areas because it would attract visitors from the residential neighborhoods to the south. Between the neighborhood retail and the retail provided within the Mixed-Use Core and Office Center districts, the Federal Quad Alternative would add 212,000 square feet of retail to the Federal Center site.

The existing open space areas at the northeastern corner and along the eastern and northern borders of the Federal Center site would be preserved. These areas would provide a green buffer between the site and the neighborhoods to the southeast, east, and north.

Overall, the Federal Quad Alternative would increase the density of the Federal Center, improve the functional organization of the site, and enhance the physical setting of the site. As a result, the alternative would provide benefits to existing and future employees, visitors, and residents.

The capital investments and physical improvements associated with this alternative would also help improve the surrounding area. The existing commercial and retail establishments located outside of the Federal Center site, particularly along Union Boulevard and 6th Avenue, would likely be positively affected by the implementation of the Federal Quad Alternative. The development of new office and support space at the Federal Center would

increase the daytime population of the site, thereby creating a larger market for goods and services in the vicinity and contributing to long-term revitalization of the area. The Mixed-Use Core district, located within walking distance of Union Boulevard and Alameda Avenue, would provide additional restaurant and retail uses as amenities for the tenants of office space in the surrounding area. In addition, the neighborhood retail at the southern end of the site would provide proximate retail for the residential neighborhoods located to the south of the Federal Center site. Given the relatively modest number of units, the new residential units on the site would have a negligible impact on surrounding residential uses.

In terms of cumulative impacts, the planned expansion of RTD's transit line, with a key station stop planned on the Federal Center site, further enhances connectivity and provides an opportunity for robust mixed-use transit-oriented development. The relocation of St. Anthony Hospital to the southwest portion of the property would increase the viability of certain retail categories, boost potential residential demand, and generate spillover medical office space demand. Available mountain views and potentially attractive green space along McIntyre Gulch add natural amenities that enhance the possibilities for residential development.

4.5.1.2 Open Space Uses

Three main categories of open space are included in the Final Master Site Plan, urban open spaces areas, perimeter open space, and urban drainage and irrigation. These designated areas total approximately 230 acres (approximately 36 percent of the site). The slight difference in the total approximate acreage between open space numbers found in the Federal Quad Alternative and the Final Master Site Plan is attributed to differences in urban drainage and urban open space.

The main focus of the urban open space will be the Central Quad. The Quad is a multi-use space designed for a variety of activities, including ceremonies and special events. In addition to the Quad, urban greens including parks, courtyards, and plazas, will be integrated into each of the districts.

The Master Site Plan also designates several streets as special green streets that will connect districts to the Intermodal Station and the Federal Quad. These will be designed with streetscape elements intended to enhance the pedestrian experience.

The perimeter open space category includes approximately 82 acres located around the perimeter of the Federal Center site. Open Space is found along the northern boundary, just south of 6th Avenue, as well as along the east boundary (Kipling Street).

These perimeter open space areas would provide a variety of opportunities for stormwater drainage facilities, recreation, storage, or demonstration projects. Wildlife habitat in these areas occurs around Downing Reservoir and the detention/retention ponds, both of which provide habitat for waterfowl. In addition, large trees in these areas provide nesting and roosting habitat for raptors and other birds. There is also potential for restoration of native grasses in portions of the perimeter open space.

Urban drainage and irrigation accounts for approximately 64 acres that includes McIntyre Gulch and the Agricultural Ditch. In addition to possible habitat for wildlife, this area includes the detention pond association with the Agricultural Ditch, stormwater retention, as well as recreation trails and picnic areas.

Urban open space accounts for the approximate remaining 84 acres. Opportunities in this area includes passive and active recreation. Potential also exists for native landscaping, pocket parks, and civic uses.

4.5.2 Federal Mall Alternative

4.5.2.1 Retail, Residential, and Office Space Uses

Under the Federal Mall Alternative, the Federal Center site would be organized into a series of distinct functional areas. A series of new federal buildings situated around a landscaped boulevard (the Federal Mall) would be located in the center of the site. These buildings in both the Federal Mall and Federal Campus districts would include approximately 2 million square feet of new federal office and related space at the site. The Mall would provide a grand entry from Union Boulevard along Center Avenue, terminating at a signature building in the heart of the Federal Center site. A park would be located just north of the Mall between 7th and 8th streets. The Mall and related office buildings would replace an underutilized area characterized by small buildings randomly placed within the grassy landscape. North, east, and south of the Federal Mall, existing federal office space would be maintained in a number of medium- to large-size buildings forming two other federal districts.

At the northwestern corner of the site, west of the Office Core, a Mixed-Use district would contain a combination of retail, residential, and office space, and, potentially, a hotel. This district would replace an area that currently consists of a series of underutilized grassy parcels bisected by roadways and dotted with small buildings. The Mixed-Use Core district would be located adjacent to the transit station and the RTD rail line, Union Boulevard, and 6th Avenue.

The Federal Mall district would include 320,000 square feet of new mixed-use office space and 788,000 square feet of new federal office space. North of the Federal Mall district, the Office Center would provide 630,000 square feet of new commercial office space adjacent to the transit station. The proximity to transit, parks, and retail uses in the adjacent Mixed-Use district make this location well suited for commercial use. This area currently contains a combination of small- to mid-size buildings, parking, roadways, and open grassy spaces.

South of Federal Mall development, an R&D district providing 446,500 square feet of new space would accommodate federal or private-sector users that need light industrial space. The area currently contains a series of small- to mid-size buildings and associated parking.

Near the southeastern corner of the Federal Center site, north of Alameda Avenue, a residential neighborhood would be created. This area, which is currently an undeveloped open area, would include medium-density residential and neighborhood retail uses. Fourteen-

hundred new residential units would be provided on the Federal Center site, including those within the Residential Neighborhood district (240 units) and those contained within the Mixed-Use district (1,160 units). Under this alternative, a park would be located north of the Residential Neighborhood, and a green buffer would be provided between the site and surrounding development areas on the east and north sides of the site.

Overall, the Federal Mall Alternative would increase the density of the Federal Center, improve the functional organization of the site, and enhance the physical setting of the site. As a result, the alternative would provide benefits to existing and future employees, visitors, and residents.

The capital investments and physical improvements that would occur under this alternative would also help improve the surrounding area. The existing commercial and retail establishments located outside of the Federal Center site, particularly along Union Boulevard and 6th Avenue, would likely receive positive benefits from implementation of the Master Site Plan. The development of new office space would increase the daytime population of the site, thereby creating a larger market for goods and services in the vicinity that could also contribute to a long-term revitalization of the surrounding area. The Mixed-Use Core district, located near the intersection of Union Boulevard and Alameda Avenue, would provide additional restaurant and retail uses as amenities for the tenants of office space outside of the Federal Center site. Although the 1,400 new residential units on the site could have a minor adverse impact on residential properties outside of the Federal Center, this would be mitigated by the addition of 9,242 new jobs on the site over 20 years.

In terms of cumulative impacts, the planned expansion of RTD's transit line, with a key station stop planned on the Federal Center site, further enhances connectivity and provides an opportunity for robust mixed-use transit-oriented development. The relocation of St. Anthony Hospital to the southwestern portion of the property would increase the viability of certain retail categories, boost potential residential demand, and generate spillover medical office space demand. Available mountain views and potentially attractive green space along McIntyre Gulch add natural amenities that enhance the possibilities for residential development.

4.5.2.2 Open Space Uses

Three main categories of open space are included in the Federal Mall Alternative, including urban open spaces areas, perimeter open space, and urban drainage and irrigation. These designated areas total approximately 193 acres (or approximately 30 percent of the site).

The main focus of the urban open space will be the approximately 40 acres that includes active recreation parks, the federal square, and boulevards and pocket parks. The square is a multi-use space designed for a variety of activities, including ceremonies and civic uses and special events. In addition to the square, urban greens including manicured landscapes and parks, courtyards, and plazas, will be integrated into each of the districts.

The Federal Mall Alternative also designates several streets as special green streets that will connect districts to the Intermodal Station and the Federal Campus District. These will be designed with streetscape elements intended to enhance the pedestrian experience.

The perimeter open space category includes 97 acres located around the perimeter of the Federal Center site. Open Space is found along the northern boundary, just south of 6th Avenue, as well as along the east boundary (Kipling Street).

These perimeter open space areas would provide a variety of opportunities for stormwater drainage facilities, recreation, storage, or demonstration projects. Wildlife habitat in these areas includes Downing Reservoir and the detention/retention ponds that provide habitat for waterfowl. In addition, large trees in these areas provide nesting and roosting habitat for raptors and other birds. There is also potential for restoration of native grasses in portions of the perimeter open space.

Urban drainage and irrigation accounts for approximately 56 acres that includes McIntyre Gulch and the Agricultural Ditch. In addition to possible habitat for wildlife, this area includes the detention pond association with the Agricultural Ditch, stormwater retention, and recreation trails and picnic areas.

Urban open space accounts for the approximate remaining 40 acres. Opportunities in this area include passive and active recreation. Potential also exists for native landscaping, pocket parks, and civic uses.

4.5.3 Mitigation

To minimize potential impacts of the increased development at the Federal Center, the Federal Center buildings should be designed to encourage physical and visual integration with surrounding development. Additionally, at the edges of the site, perimeter security barriers should be minimized and employed only when a user requires a secure site, and building level security should be encouraged. Nevertheless, physical connections should be enhanced between the Federal Center site and the surrounding neighborhoods.

4.5.4 No Action Alternative

4.5.4.1 Retail, Residential, and Office Space Uses

Under the No Action Alternative, the Master Site Plan would not be implemented at the Federal Center site. Functional improvements, physical enhancements, or other benefits to the site would be limited to those already budgeted or planned for in the 1997 Master Plan. The RTD Intermodal Station and St. Anthony Hospital projects would still be constructed in the western portion of the Federal Center site, adding 1,600 employees to the site.

4.5.4.2 Open Space Uses

Under the No Action Alternative, the concept of open space is addressed without sub-categorizations. Approximately 350 acres (or approximately 50 percent of the Federal Center) was considered open space at the beginning of the planning process for the Master Site Plan in 2005.

4.6 Socioeconomic Impacts

The general methods, assumption, and definition of terms described in Subsection 4.4 apply to this resource topic.

Socioeconomic impacts stemming from the redevelopment of the Federal Center would likely occur directly on the Federal Center site and indirectly within the urban environment immediately surrounding the site. Additionally, further indirect impacts may be observed in outlying areas beyond the immediate Federal Center study area, including downtown and other existing federal office tenants who might relocate to the Federal Center; the existing Saint Anthony Central Hospital area in Denver; other West Corridor transit-oriented development sites; and other growth sites in western metropolitan Denver area that could compete with the Federal Center for residential, retail, or office development.

Census-based statistical projections of population growth suggest a flat to slightly negative growth rate for the Federal Center study area (but these projections do not include potential growth within the Federal Center as discussed in Subsection ~~Section~~ 3.2). The population-related effects of a given Master Site Plan alternative, therefore, would be a function of potential residential growth, including direct population increases within the Federal Center site or indirect increases in the surrounding area and potential changes to the existing demographic profile.

Employment-related impacts would be a result of the direct incremental growth in employment that would occur on the Federal Center site under each alternative. Indirect employment growth in the Federal Center study area could result from current forecast levels.

Potential socioeconomic impacts could result from a major shift in population, housing, or employment in the Federal Center study area, in the City of Lakewood, or in Jefferson County overall. Both population and employment for the United States as a whole are projected to grow at approximately 1 percent per year over the next decade. Localities with annual population increases of double this rate (2 percent) are generally considered “high growth” areas. Sustained levels of high growth can result in socioeconomic impacts that are both negative (e.g., crowding, sprawl) and positive (e.g., economic vitality, new cultural resources). For the purpose of this analysis, a sustained 2.0 percent annual increase or decrease in any of these indicators would be considered a major change.

4.6.1 Federal Quad Alternative—Preferred Alternative

Population growth under the Federal Quad Alternative would result from the addition of ~~290~~ 1,400 residential units that would be located within the transit-oriented development district (Mixed-Use Core) near the planned light rail station. Because these units would be primarily condominiums and apartments, household sizes would be smaller than is typical for existing housing in the surrounding area. Conservatively assuming 2.0 persons per household, the proposed housing units at the Federal Center would generate direct population growth of approximately ~~2,800~~ 2,800 residents over 20 years. These new residents would represent a net increase in the annual growth rate of about 0.50 ~~0.4~~ percent in the affected area, well below

the 2.0 percent standard of significance. Given the large quantity of currently available land within the Federal Center, and the higher-density nature of nearby existing development along Union Boulevard, this level of residential development within the Federal Center would likely have a negligible impact on existing populations in the surrounding area.

Implementation of the Federal Quad Alternative is not anticipated to have substantive impacts to the ethnic profile or education levels of the surrounding area. Because the new employment opportunities provided under this alternative may involve primarily white collar professions rather than service or blue collar occupations, income levels in the area may rise slightly. This effect depends on whether the new development can help attract employees from among residents in the immediate vicinity or whether new residential options may entice existing employees to seek housing on-site or nearby. Overall, impacts to the existing demographic characteristics of the surrounding area would not be expected.

Direct net employment growth within the Federal Center generated under the Federal Quad Alternative is projected to reach approximately 9,757 jobs over 20 years, based on market-supported development of new federal and private-sector buildings, and standard building space/employment ratios for the various land uses. This employment growth includes 3,200 non-federal office jobs (at 250 square feet per employee), 1,800 non-federal research and development jobs (at 350 square feet per employee), 424 retail jobs (at 500 square feet per employee) and 4,333 federal jobs (with new federal space added at 300 square feet per employee less demolished space at 600 square feet per employee). These projected jobs are assumed to be permanent additions to the employment base, as opposed to temporary, construction-related increases. Over a 25-year development timeframe, this alternative would create a net job growth of approximately 1.5 percent annually, below the 2.0 percent annual standard of significance.

In addition to the proposed Federal Center improvements, cumulative impacts on employment could result from other proposed or ongoing projects in the area. The hospital relocation and related medical activities are expected to result in an additional 2,600 to 3,100 new jobs. Additionally, employment growth outside the current Federal Center confines is projected to reach approximately 6,000 additional jobs by 2030 (not including hospital related growth), per TAZ-level forecasts from DRCOG. The cumulative impact of these sources of growth, combined with job growth anticipated from the Federal Quad Alternative, would result in an overall annual employment growth rate of 1.8 percent annually over a 25-year period. This rate is still below the 2.0 percent threshold to be considered a major change.

Given the substantial employment concentration already located within the Federal Center site and the number of jobs that would be generated by St. Anthony Hospital, this increase in well-paying jobs would have a positive cumulative socioeconomic impact on the surrounding area through increased retail spending and the potential for additional spin-off job creation. Overall, to the extent that the Federal Center can accommodate employment growth rather than relocation, the Federal Quad Alternative would contribute positively to the fiscal health of surrounding jurisdictions.

Under the Federal Quad Alternative there would be a significant positive impact to both sales tax and property tax revenue streams into city and county coffers. Assuming a blended annual sales rate of \$250 per square feet for new retail space, the 212,000 square feet of retail provided under this alternative would generate new annual taxable sales of approximately \$53,000,000 (in current dollars). Increases in property tax revenues are more difficult to estimate, given the blend of taxable and non-taxable properties contemplated for the site; however, those increases are likely to be substantial as well.

Although a fiscal impact analysis was not conducted, it is highly likely that revenue increases would exceed the cost of additional service demand imposed on local jurisdictions under this alternative. This increase would be a result of both the relatively limited scope of residential development and the fact that much of the security for the overall project would continue to be maintained by federal employees and facilities.

4.6.2 Federal Mall Alternative

Population growth under the Federal Mall Alternative would result from the addition of 1,400 residential units. The locations of these units would be divided between the transit-oriented development district near the planned light rail station and the area in the southeast portion of the Federal Center site. These units would consist primarily of condominiums and apartments near the transit center and townhouses in the southeastern portion of the property. As a result, average household sizes would be smaller than is typical for existing housing in the surrounding area. At 2.1 persons per household, the 1,400 new housing units at the Federal Center would generate direct population growth of approximately 2,940 residents over 20 years. These new residents would represent a net increase in the annual growth rate of 0.5 percent in the study area, below the 2.0 percent standard of significance. Given the large quantity of currently available land within the Federal Center, and the higher-density nature of nearby existing development along Union Boulevard, this level of residential development should have a negligible impact on existing populations in the surrounding area.

Implementation of the Federal Mall Alternative is not anticipated to have substantive impacts to the ethnic profile or education levels of the surrounding area. Because the new federal and private-sector permanent employment opportunities included under this alternative may involve primarily white collar professions rather than service or blue collar occupations, income levels in the area may rise slightly. This effect depends on whether the new development can help attract employees from among residents in the immediate vicinity or whether new residential options may entice existing employees to seek housing on-site or nearby. Overall, impacts to the existing demographic characteristics of the surrounding area would not be expected.

Direct net employment growth within the Federal Center generated under the Federal Mall Alternative is projected to reach approximately 10,576 jobs over 20 years, based on market-supported development of new federal and private-sector buildings, and standard building space/employment ratios for the various land uses. This growth includes 3,800 non-federal office jobs, 1,276 non-federal research and development jobs, 500 retail jobs, and 5,000 federal jobs. (Employees per square feet ratios are the same as outlined above.) These projected employment figures are assumed to be permanent jobs and do not include

temporary construction-related jobs. Over the 25-year development timeframe, the 10,576 new jobs created by this development alternative would cause a net job growth of 1.7 percent annually, below the 2.0 percent annual standard of significance.

As described under the Federal Quad Alternative, cumulative impacts on employment could result from other proposed or ongoing projects in the area. Taking into account anticipated hospital-related job growth and employment gains outside the Federal Center site, the cumulative impact anticipated under the Federal Mall Alternative would result in an overall annual employment growth rate of 1.9 percent annually over a 25-year period. This rate is still below the 2.0 percent threshold to be considered a major change.

Given the substantial employment concentration already located in the Federal Center site, and the number of jobs that would be generated by St. Anthony Hospital, this increase in well-paying jobs would have a positive contribution to cumulative socioeconomic impacts on the surrounding area through increased retail spending and the potential for additional spin-off job creation. Overall, to the extent that the Federal Center can accommodate employment growth rather than relocation, the Federal Mall Alternative would contribute positively to the fiscal health of surrounding jurisdictions.

Under the Federal Mall Alternative there would be a significant positive impact to both sales tax and property tax revenue flowing into the City of Lakewood. Assuming a blended annual sales rate of \$250 per square feet for new retail space, the 250,000 square feet of retail provided under this alternative would generate new annual taxable sales of approximately \$62,500,000 (in 2006 dollars). Increases in property tax revenues are more difficult to estimate given the blend of taxable and non-taxable properties contemplated for the site; however, those increases are likely to be substantial as well.

Although a fiscal impact analysis was not conducted, it is highly likely that revenue increases would exceed the cost of additional service demand imposed on local jurisdictions under this alternative. This increase would be a result of both the relatively limited scope of residential development and the fact that much of the security for the overall project would continue to be maintained by federal employees and facilities.

4.6.3 No Action Alternative

Under the No Action Alternative, direct socioeconomic impacts would not result. However, given current trends in population, it is reasonable to assume that a continued stagnation of population in the study area would likely adversely affect employment growth in the surrounding area, relative to DRCOG forecasts. Cumulative impacts to employment at the Federal Center site would still be beneficial from the hospital relocation, but would likely decline over time, because government tenants are drawn to office and research/flex developments located in more updated and stimulating environments. Existing facilities would adequately provide necessary space and services to tenants.

4.7 Environmental Justice Impacts

Neither low-income nor minority populations were found in the study area in substantial or disproportionate measure. As a result, the Master Site Plan alternatives would not have a disproportionate effect on environmental justice communities. To the extent that employment levels would increase within the Federal Center and study area, the Master Site Plan alternatives could have a positive impact on environmental justice.

4.8 Community Services Impacts

The general methods, assumption, and definition of terms described in Subsection 4.4 apply to this resource topic.

The following assumptions have been made with respect to community services: (1) demand for community services and facilities is a function of population; (2) community services will remain available for all residents within a specific government jurisdiction; and (3) except for complete closure of the Federal Center, no community services-related impacts would be expected to result from a decreased level-of-use of the Federal Center. Since local jurisdictions provide public services, changes in populations were considered the single most important determinant of effects on service provisions. Potential impacts to public services within the Federal Center would be considered significant if implementation of the preferred alternative proposed action would require additional staffing or equipment investments or some form of an unacceptable burden on the respective service.

4.8.1 Action Alternatives

Medical Facilities. Changes to medical facilities and services would not occur under either Master Site Plan alternative; therefore, direct impacts on medical facilities would not result. Though not part of the proposed action alternatives, the relocation of St. Anthony Hospital to the area just south of the transit area would provide additional medical services to the area, contributing to a positive cumulative impact. The relocation and projected opening of St. Anthony Hospital in 2010 would result in a full-service hospital in Lakewood. The hospital would be the only trauma center within city limits, and residents requiring hospital services, including those with medical emergencies, would not have to travel as far to receive the care they need. The hospital would also reduce the number of patients that rely on the hospitals in surrounding communities.

Fire Protection. Implementation of either Master Site Plan alternative may potentially result in an increase in demand for fire protection services as daily and residential populations grow. WMFPD can increase the level of services if it is determined to be necessary as a result of the proposed Federal Center improvements.

According to WMFPD, the construction of a new hospital within the Lakewood city limits would have little effect on the firefighting and emergency response services to the Federal Center site. Cumulative impacts on fire protection services, therefore, would not be anticipated.

Police Protection. Implementation of either Master Site Plan alternative may potentially result in an increase in demand for police protection services as daily and residential populations grow. Indirect impacts would also be expected. As Lakewood grows, an increase in demand for police protection services would be expected; however, a decrease in the level of protective services would not be expected. FPS has the capacity to increase the level of security at the Federal Center if it is determined to be necessary.

Transit Services. Implementation of either Master Site Plan alternative may potentially result in an increase in demand for transit services as daily and residential populations increase. Once the West Corridor Light Rail transit line and associated Federal Center station and park-n-Rides are available, the demand for, and use of, transit services would be expected to increase. In addition, the relocation of St. Anthony Hospital would create an additional destination in this area, potentially contributing to a negligible increase in transit services demand and usage.

4.8.2 No Action Alternative

Under the No Action Alternative, improvements directly related to the implementation of Master Site Plan would not occur, so changes to demand for and level of service of public services would not result. The hospital and RTD Intermodal Station projects, however, would move forward, so cumulative transit services impacts associated with the these projects would still result under the No Action Alternative.

4.9 Public Utilities Impacts

The general methods, assumption, and definition of terms described in Subsection 4.4 apply to this resource topic.

Potential impacts to public utilities within the Federal Center would be considered significant if the implementation of the preferred alternative proposed action results in a measurable change in demand for utility infrastructure or if the required services were in conflict with adopted plans and policies for the area. Significant impacts would also result if implementation of the preferred alternative proposed action would cause major disruptions of service and serious degradation of existing performance characteristics or if major new facilities and equipment would be required.

4.9.1 Action Alternatives

The two concepts for the development alternatives would share common opportunities and constraints, requiring similar approaches for development of the Federal Center. To the maximum extent practicable, each concept would use the trunk, or backbone, infrastructure systems that exist at the Federal Center today, though planned and future upgrades would occur. The common elements that are part of each concept are as follows:

- Use McIntyre Gulch and the northern and eastern ponds for stormwater management, along with on-site stormwater detention and water quality requirements for new developments prior to discharging to McIntyre Gulch.

- Expand and maintain the McIntyre Gulch area beyond stormwater management needs for recreation and open space.
- Use connections to both private off-site utilities companies and GSA for servicing the expansion areas outside of the Federal Center core area for the water supply and sanitary sewer systems.
- Provide an opportunity for mixed-use and dense development at the northwestern corner of the Federal Center site through the RTD ~~light rail transit station~~ Intermodal Station.
- Allow for planned infrastructure improvements that would allow for growth within the Federal Center site.

The major difference between the two alternatives is the need for rerouting of infrastructure. The Federal Quad Alternative would maintain the existing roadway and parcel layout of the site within the core area to the east of Fifth Street, allowing for the existing utilities to be maintained for servicing this area. To the west of Fifth Street, new mains and service lines would be needed within each respective infrastructure system to follow the proposed roadway network. The service concepts for water supply, sanitary sewer, and drainage are practically identical for both alternatives; however, the Federal Quad Alternative would require that the layout for each infrastructure system be tied to the proposed roadway layout, timing, and sequencing of this alternative.

The Federal Mall Alternative would create the most development square footage and require use of more land at the Federal Center site to implement. This alternative layout does maintain the existing roadway network for the entire core area, allowing for infrastructure expansion efforts to occur at the new development areas while maintaining the existing infrastructure backbone in the core area. The concept of a larger development area would need to be carefully sequenced to allow for just-in-time delivery of infrastructure to minimize funding outlays for construction of infrastructure across the site.

For both alternatives, the sizing and placement of all utility lines would need to be further studied to identify, address, and implement the service concepts. The gas, electricity, and telecommunications utilities currently serving the Federal Center site would continue to be the franchise utilities operating in the area, as established by the Public Utilities Commission for the state of Colorado.

Water Supply System. The Consolidated Mutual Water Company (CMWCo), the City of Lakewood, Denver Water, and GSA have met multiple times to determine a strategy for supplying the Federal Center site with water in the future. GSA has indicated that it would like the portions of the campus that might be available for future development to be served via GMWSD or CMWCo and the balance of the site to remain on a master meter system. Both GMWSD and CMWCo have coordinated and agreed to a boundary for the division of the Federal Center water system in the future; however, agreements have not been formalized between the water districts and GSA. System upgrades and service improvements associated with the action alternatives would result in a positive impact on the water supply system.

Water supply service agreements have been made for the planned development of St. Anthony Hospital and the proposed development related to RTD's planned ~~light rail~~ Intermodal Station on the Federal Center campus. GMWSD indicates that they plan to serve the hospital and RTD developments via a new trunk main loop, that no individual service line connections will be allowed to the system, and that all improvements must be part of a master plan expansion to the water system. The upgrades currently underway (see Chapter 3, Subsection 3.4.6 ~~3.5.4~~) to the water supply infrastructure will result in a positive impact to the water supply system. The systems have been sized to deliver adequate services for the fire and protection and domestic flows (CH2M Hill, Inc. 2006). Overall, improvements to the infrastructure and service would result in a cumulative positive impact.

Sanitary Sewer System. Upgrades to the existing sanitary sewer system associated with the proposed master plan would include an increase in capacity within the Federal Center. The proposed development of either action alternative requires the evaluation of the capacity of the sanitary outfall within the City of Lakewood, any associated upgrades or replacements needed, and confirmation with MWRD that the additional flows are acceptable.

The upgrades currently underway (see Chapter 3, Subsection 3.4.7 ~~3.5.2~~) will increase capacity and improve the physical integrity of the system, resulting in a positive impact to the sanitary sewer system. Development of the Federal Center site would not constrain the sanitary sewer system, so sanitary system capacity impacts within the Federal Center would not result. The Feasibility Study (CH2M Hill, Inc. 2002) noted that 6,300 linear feet of sanitary sewer runs through contaminated groundwater plumes. Upgrades to the system would address the issue of contamination and result in a positive impact to the sanitary sewer system.

The RTD ~~light rail station~~ Intermodal Station and St. Anthony Hospital development project sites on the western edge of the Federal Center campus are anticipated to connect to the GMWSD sanitary outfall system at Alameda Avenue. GMWSD has indicated that their outfall at Alameda Avenue will require expansion to provide service. These proposed projects, therefore, could result in slight cumulative impacts through the additional demands on the system.

Stormwater Sewer System. Upgrades to the stormwater sewer system associated with the proposed master plan would continue to use McIntyre Gulch and the northern and eastern ponds for stormwater management, along with on-site stormwater detention and water quality requirements for new developments prior to discharging to McIntyre Gulch. Under either action alternative, McIntyre Gulch would be expanded and maintained for recreation and open space. Stormwater system upgrades would be consistent with the City of Lakewood and UDFCD guidelines, thereby resulting in positive impacts. The upgrades currently underway (see Chapter 3, Subsection 3.4.8 ~~3.5.3~~) will increase capacity and improve the physical integrity of the system, resulting in a positive impact to the stormwater sewer system.

Electrical Power System. Implementation of either action alternative would result in increased demand on the electrical power system; however, the capacity to handle this increased demand is already in place. In addition, the electrical power system upgrades currently

underway (see Chapter 3, Subsection 3.4.9 ~~3.5.4~~) will replace critical electrical components, resulting in a cumulative positive impact to the electrical power system. The addition of the solar park will contribute to cumulative impacts and provide annual energy value to offset Federal Center electrical use and reduce greenhouse gas contributions, also resulting in a positive cumulative impact to the electrical power system.

Natural Gas Service. Under either Master Site Plan alternative, demands for natural gas would increase, requiring associated upgrades for natural gas service and resulting in a slight impact on natural gas service. Xcel Energy has the capacity to increase service to the Federal Center and surrounding area, so impacts to natural gas service would be minor. Future developments at the Federal Center would require a shifting of the franchise boundary to establish a billing structure for Xcel Energy. Within the core area of the Federal Center campus, GSA has indicated a preference for maintaining the master meter agreement for service.

In terms of cumulative impacts, the RTD transit and St. Anthony Hospital projects would result in an increased demand for natural gas service.

Telecommunications System. Under either master plan alternative, demands for telecommunications would increase, requiring associated infrastructure upgrades for service to new customers. The upgrades currently underway (see Chapter 3, Subsection 3.4.11 ~~3.5.6~~) will replace critical communications components, resulting in a positive impact to the telecommunications system. Ongoing and planned upgrades (contingent upon funding) would be capable of handling the increased demand for service; therefore, impacts on the telecommunications system would not result.

In terms of cumulative impacts, the RTD transit and St. Anthony Hospital projects would result in an increased demand for telecommunications services; however, the capacity to meet these needs already exists.

Easements and Rights of Way. In areas that are slated for potential transfer to third parties (St. Anthony Hospital or others), issues relating to franchise rights, annexation to the City of Lakewood, and inclusion in governing water and sewer districts would be required. As capital improvements are made throughout the Federal Center site, the layout of infrastructure should consider dedication of easements and placement of utilities within rights-of-way or utility corridors. These improvement placements and land dedications would be needed prior to transferring the land or other property rights. For the core area, utility corridors should be utilized to manage the placement of utilities and to minimize impacted areas for providing ongoing utility service and maintenance.

4.9.2 No Action Alternative

The No Action Alternative would not result in public utilities impacts. Utilities services upgrades associated with the Master Site Plan would not occur, but the implementation of GSA's infrastructure projects would upgrade (contingent upon funding) the utility service within the central core area of the Federal Center and accommodate a planned expansion across the site (from the existing utility lines). The need for an additional water supply connection and to address contamination of groundwater would remain. McIntyre Gulch

would still require updates to be in conformance with UDFCD criteria and deteriorating or obsolete electrical equipment would remain in service.

4.10 Transportation Impacts

The general methods, assumption, and definition of terms described in Subsection 4.4 apply to this resource topic.

Transportation impacts could potentially result from changes to land use and densities associated with a development alternative. Table 4-1 provides a land use summary of the two action alternatives: the defining characteristic of the Federal Quad Alternative is the central Quad, which is located in the center of the Federal Center site; the defining characteristic of the Federal Mall Alternative is the creation of a linear Federal Mall connecting Union Boulevard, St. Anthony Hospital, and the Federal Core. As shown in Table 4-1, the Federal Mall Alternative proposes significantly more office square footage and residential units but less research and development square footage. The size of the other land uses is either identical or comparable between the two alternatives.

The purpose of the analysis was to assess the cumulative effects of all proposed developments on the transportation system (including, but not limited to, the St. Anthony Hospital relocation, the RTD Intermodal Station, various in-fill proposals, and possible changes to the Federal Center site) and to identify improvements that will mitigate expected impacts.

4.10.1 *Baseline Conditions*

To determine how efficiently and effectively the existing roadway network accommodates these future volumes, all of the signalized intersections in the vicinity of the Federal Center were analyzed. The results are shown as level of service or “LOS.” LOS is a qualitative measure used to describe the condition of traffic flow and delay, ranging from excellent conditions with very low delay at LOS-A to over saturation and extensive queuing at LOS-F. LOS-D is the minimum desired performance and LOS-E is the minimum acceptable level of service at signalized intersections.

The baseline conditions were determined for the existing scenario (in the year 2006), in the year 2015, and in the year 2030. Table 4-2 lists the results. These conditions represent the traffic LOS under the scenario of continuation of existing conditions, i.e., no significant roadway improvements.

As part of the transportation analysis, the internal street system was also analyzed. The internal roadway network has adequate capacity to serve the increased daily population accessing the Federal Center. In addition, this alternative is consistent with recommendations contained in the *Lakewood Bicycle Master Plan*, which was adopted in 2005 by the City of Lakewood, and complements all transit plans for the area.

TABLE 4-2:
 Baseline Level of Service

Intersection	2006		2015		2030	
	AM	PM	AM	PM	AM	PM
Simms Rd. and 8th Ave.	B	B	B	C	C	C
Union Blvd. and 6th Ave. Westbound Ramps	B	E	C	F	C	F
Union Blvd. and 6th Ave. Eastbound Ramps	A	B	B	D	B	D
Union Blvd. and 4th Ave. (Gate 4)	C	C	C	E	C	F
Union Blvd. and 2nd Ave. (Gate 5)	B	B	D	D	D	E
Union Blvd. and 1st Ave.	A	A	A	B	A	C
Union Blvd. and Cedar Dr.	A	B	B	C	B	E
Union Blvd. and Alameda Ave.	C	F	D	F	F	F
Alameda Ave. and Urban Ave.	A	B	A	C	A	F
Alameda Ave. and Oak St. (Gate 7)	C	D	C	D	C	D
Alameda Ave. and Kipling St.	C	E	D	F	E	F
Kipling St. and Gate 1	A	A	A	B	A	B
Kipling St. and Gate 2	A	B	A	B	A	B
Kipling St. and 6th Ave. Frontage Rd.	B	B	B	C	B	C

Source: Matrix Design Group (2006)

4.10.2 Federal Quad Alternative—Preferred Alternative

The Federal Quad alternative utilizes six main access points to the Federal Center. Each access is described below:

- Union Boulevard and North Avenue—This is an existing access point and is currently designated as Gate 4.
- Union Boulevard and 2nd Avenue—This is an existing access point and is currently designated as Gate 5.
- Alameda Avenue and Routt Street—This is a new access point and is part of the West Corridor Light Rail Transit Federal Center Station and St. Anthony Hospital projects.
- Alameda Avenue and 7th Street—This is an existing access point and is currently designated as Gate 7.
- Kipling Street and Main Avenue—This is an existing access point and is currently designated as Gate 1.
- Kipling Street and Center Avenue—This is an existing access point and is currently designated as Gate 2.

Once traffic enters the site, it is distributed via a network of collector and local streets. The collector streets include North Avenue, Center Avenue, Main Avenue, Routt Street, and 7th Street. All collector streets provide four travel lanes (two lanes in each direction). All other streets will be classified as local streets. These are two lanes wide (one lane in each direction).

To determine how many additional trips will be generated, how these trips will be generated, and how these trips may impact the transportation system, a subarea travel demand model was developed. A detailed description of this model is contained in the *Lakewood West Central Subarea Transportation Study* report (City of Lakewood 2006).

The model was run with the proposed development associated with the Federal Quad Alternative. The Federal Quad Alternative is expected to generate approximately 61,300 vehicle trips at build-out—four times the number of trips generated by the existing land uses at the Federal Center. As part of both alternatives, mitigation measures would include roadway improvements such as intersection improvements at Union Boulevard and 4th Avenue, Union Boulevard and 2nd Avenue, Alameda Avenue and 7th Street, and the Union Boulevard and 6th Avenue interchange. In addition, widening of Kipling Street and Alameda Avenue would occur. These improvements are described further in the mitigation description, ~~Subsection Section 4.10.4~~ 4.6.4. To give accurate projections of LOS, the model was also run taking these improvements into account.

Exhibit 4-1 shows the 2030 daily traffic forecasts for the Federal Quad Alternative. To determine how efficiently and effectively the existing roadway network will accommodate these future volumes, all of the signalized intersections in the vicinity of the Federal Center were analyzed. As shown in Table 4-3, four of the intersections in the AM peak hour and nine of the intersections in the PM peak hour would fail to meet the minimum acceptable service levels established by the City of Lakewood if the Federal Quad Alternative were implemented without the mitigation of improvements. As shown in Table 4-3, however, when the proposed improvements are factored in, all of the intersections in the AM peak hour and all but one intersection in the PM peak hour either meets or exceeds the minimum acceptable service levels for signalized intersections. The lone exception is the intersection of Union Boulevard and Alameda Avenue, which currently fails to meet an acceptable service level. The primary problem is that Union Boulevard goes from three lanes north of Alameda Avenue to one lane south of Alameda Avenue. An established residential neighborhood is located to the south of Alameda Avenue, making it highly unlikely this segment of Union Boulevard would ever be widened.

4.10.3 Federal Mall Alternative

Under the Federal Mall Alternative, entry to the Federal Center would be provided via the five existing entry gates and two additional new gates. New and reconfigured access points include:

- Alameda Avenue and Routt Street—This new access point is part of the West Corridor Light Rail Transit Federal Center Station project.
- Alameda Avenue and Lewis Street—This new access point is intended to serve the land uses in the southeast corner of the site.



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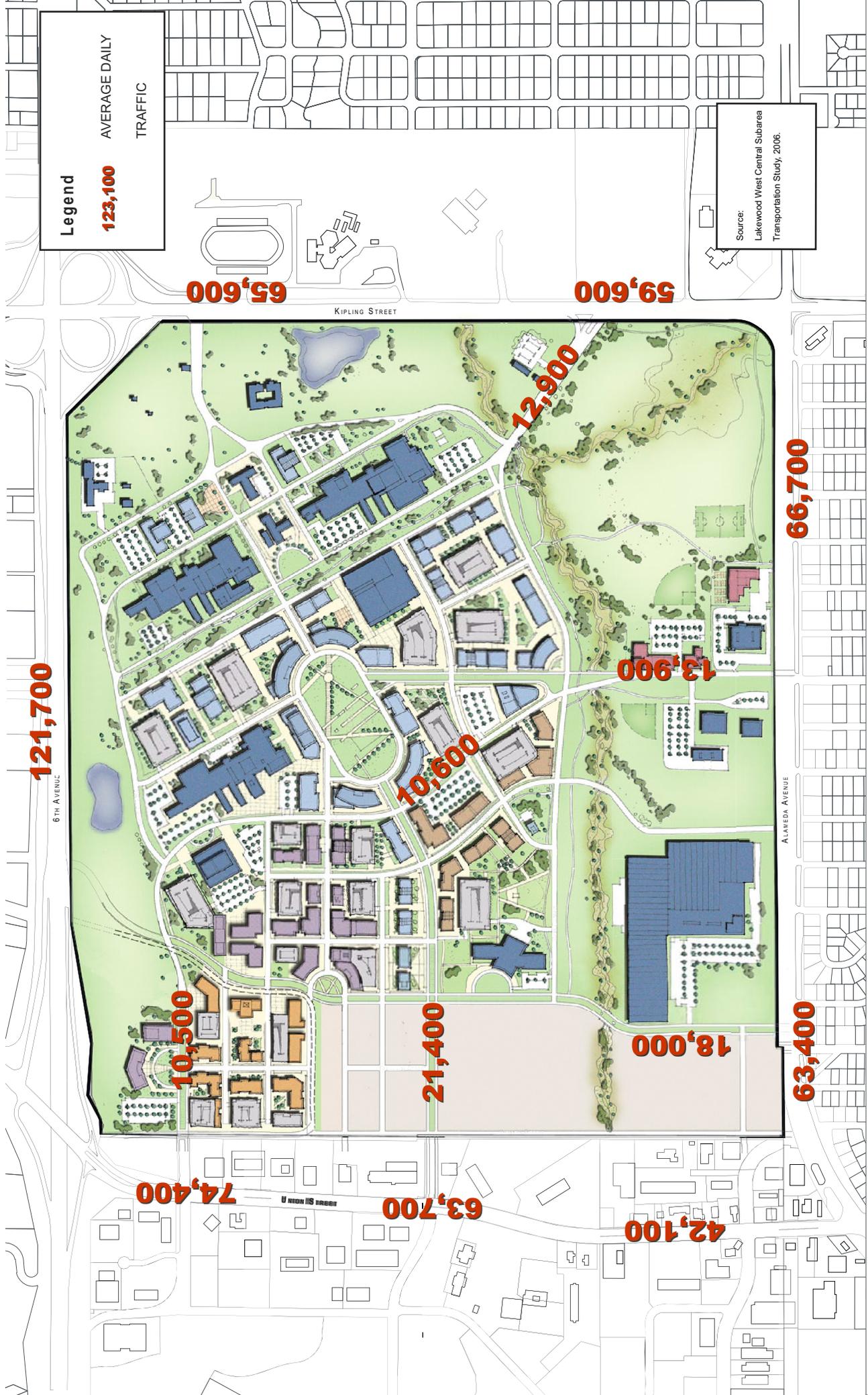


FIGURE 4.1: 2030 TRAFFIC FORECASTS - QUAD

TABLE 4-3:
 2030 Levels of Service for Federal Quad Alternative

Intersection	2030 Base Network ¹		2030 With Improvements ²	
	AM	PM	AM	PM
Simms Rd. and 8th Ave.	B	C	B	C
Union Blvd. and 6th Ave. Westbound Ramps	C	F	C	D
Union Blvd. and 6th Ave. Eastbound Ramps	B	E	B	B
Union Blvd. and 4th Ave. (Gate 4)	C	F	C	D
Union Blvd. and 2nd Ave. (Gate 5)	D	F	C	E
Union Blvd. and 1st Ave.	A	C	A	C
Union Blvd. and Cedar Dr.	B	D	B	D
Union Blvd. and Alameda Ave.	F	F	E	F
Alameda Ave. and Urban Ave.	B	F	A	C
Alameda Ave. and Oak St. (Gate 7)	F	F	C	D
Alameda Ave. and Kipling St.	F	F	E	E
Kipling St. and Gate 1	D	F	A	B
Kipling St. and Gate 2	F	F	A	B
Kipling St. and 6th Ave. Frontage Rd.	B	D	B	D

Source: Matrix Design Group (2006)

¹ Assesses how existing roadway network accommodates the Federal Quad Alternative.

² Includes improvements listed in transit plans and development associated with the Federal Quad Alternative.

- **Kipling Street and Main Avenue**—This is an existing access point and is currently designated as Gate 1; however, it should be noted that this intersection is being moved slightly to the north to better align with access to the east. This improvement was recommended in the transportation plan developed for the Federal Center Master Plan (GSA 2006).
- Other access points as described under the Quad Alternative.

Once traffic enters the site, it is distributed via a network of collector and local streets. The collector streets include North Avenue, Center Avenue, Main Avenue, Quail Street, 6th Street and 7th Street. All collector streets provide four travel lanes (two lanes in each direction). All other streets will be classified as local streets. These are two lanes wide (one lane in each direction).

Based on standard trip generation rates for the proposed land uses, the Federal Mall Alternative is expected to generate approximately 75,600 vehicle trips per day at build-out. This is slightly less than five times the number of trips generated by the existing land uses at the Federal Center. To determine how these additional trips may affect the transportation system, a subarea

travel demand model was developed. A detailed description of this model is contained in the *Lakewood West Central Subarea Transportation Study* (City of Lakewood 2006).

The model was run with proposed development associated with the Federal Mall Alternative, and again taking the proposed roadway improvements into account. Exhibit 4-2 shows the 2030 daily traffic for the Federal Mall Alternative. To determine how efficiently and effectively the existing roadway network accommodates these future volumes, all of the signalized intersections in the vicinity of the Federal Center were analyzed. As shown in Table 4-4, with the base network, five of the intersections in the AM peak hour and nine of the intersections in the PM peak hour would fail to meet the minimum acceptable service levels established by the City of Lakewood. With the mitigation of improvements, all intersections meet the minimum LOS with the exception of the PM LOS for the Union Boulevard and Alameda Avenue intersection, which currently fails to meet an acceptable service level.

TABLE 4-4:
2030 Levels of Service for Federal Mall Alternative

Intersection	2030 Base Network ¹		2030 With Improvements ²	
	AM	PM	AM	PM
Simms Rd. and 8th Ave.	B	C	B	C
Union Blvd. and 6th Ave. Westbound Ramps	C	F	C	D
Union Blvd. and 6th Ave. Eastbound Ramps	B	E	B	B
Union Blvd. and 4th Ave. (Gate 4)	C	F	C	E
Union Blvd. and 2nd Ave. (Gate 5)	F	F	C	E
Union Blvd. and 1st Ave.	A	C	A	C
Union Blvd. and Cedar Dr.	B	E	B	E
Union Blvd. and Alameda Ave.	F	F	E	F
Alameda Ave. and Urban Ave.	B	F	B	E
Alameda Ave. and Oak St. (Gate 7)	F	F	D	D
Alameda Ave. and Kipling St.	F	F	E	E
Kipling St. and Gate 1	D	F	A	D
Kipling St. and Gate 2	F	F	A	B
Kipling St. and 6th Ave Frontage Rd.	B	D	B	D

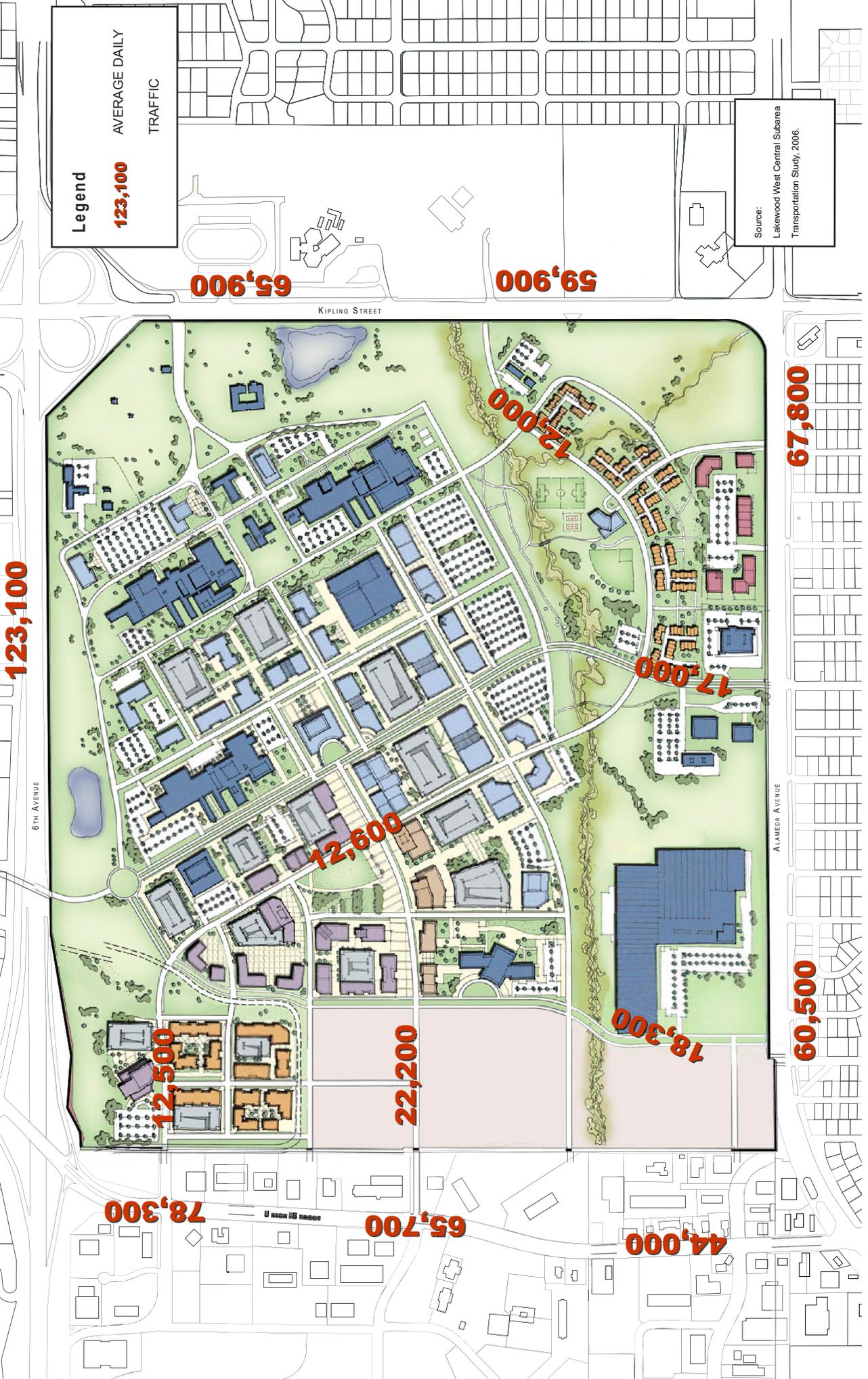
¹ Assesses how existing roadway network accommodates the Federal Mall Alternative.

² Includes improvements listed in transit plans and development associated with the Federal Mall Alternative.

~~As part of the transportation analysis, the internal street system was also analyzed. The internal roadway network has adequate capacity to serve the increased daily population accessing the Federal Center. In addition, this alternative is consistent with all recommendations contained in the *Lakewood Bicycle Master Plan*, which was adopted in 2005 by the City of Lakewood, and complements the transit plans for the area.~~



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Legend
123,100
AVERAGE DAILY
TRAFFIC

Source:
Lakewood West Central Subarea
Transportation Study, 2006.

FIGURE 4.2: 2030 TRAFFIC FORECASTS - MALL

4.10.4 Mitigation

To minimize potential adverse impacts of the increased development at the Federal Center on roadway system, several improvements would be required. Each improvement is listed below and applies to both the Federal Quad and Federal Mall alternatives.

4.10.4.1 Roadway Improvements

Roadway improvements should include the following measures:

- Widen Alameda Avenue to six lanes from west of Union Boulevard to Allison Street.
- Widen Kipling Street to six lanes from 6th Avenue to Mississippi Avenue.
- Extend the proposed Routt Street to the north over 6th Avenue and connect to Quail Street. Routt Street should be four lanes from Alameda Avenue to 8th Avenue. Separate left-turn lanes should be provided at all signalized intersections.

4.10.4.2 Intersection Improvements

Intersection improvements should include the following measures:

- Provide two westbound right-turn lanes at the intersection of Union Boulevard and 4th Avenue.
- Provide two westbound right-turn lanes, two southbound left-turn lanes, and one southbound right-turn lane at the intersection of Union Boulevard and 2nd Avenue.
- Provide two eastbound left-turn lanes, one southbound exclusive left-turn lane and one shared left- and right-turn lane, and one westbound right-turn lane at the intersection of Alameda Avenue and Routt Street.
- Provide two eastbound left turn lanes, two southbound left-turn lanes, two southbound right-turn lanes, and one westbound right-turn lane at the intersection of Alameda Avenue and 7th Street.
- Provide a northbound left turn at the intersection of Kipling Street and Gate 1. This will require a realignment of the access to the Jefferson County stadium on the eastern side of Kipling.

4.10.4.3 6th Avenue and Union Boulevard Interchange Improvements

Interchange improvements should include the following measures:

- Widen bridge by two lanes to accommodate double lefts from northbound to westbound and southbound to eastbound.
- Signalize the double right turns from the westbound off ramp to northbound Simms Street.
- Expand eastbound off ramp for double left turns and double right turns.

Implementation of these roadway and interchange improvements would improve the roadway LOS, as shown in Tables 4-3 and 4-4. The lone exception is at the Union Boulevard and Alameda Avenue intersection. Because widening Union Boulevard south of Alameda Avenue would be too disruptive to the residential neighborhood, a grade-separated facility may be necessary to accommodate 2030 traffic volumes.

4.10.5 No Action Alternative

For the No Action Alternative, the existing roadway network was analyzed using 2030 traffic forecasts but assumed no change to the existing Federal Center land use density and mix. In addition, the roadway and intersection improvements associated with the Federal Center Master Site Plan would not be implemented under the No Action Alternative. As shown in Table 4-5, one intersection in the AM peak hour and five intersections in the PM peak hour would fail to meet the minimum acceptable service levels established by the City of Lakewood and be over capacity in 2030.

TABLE 4-5:
2030 Levels of Service for No Action Alternative

Intersection	2030 Base Network	
	AM	PM
Simms Rd. and 8th Ave.	C	C
Union Blvd. and 6th Ave. Westbound Ramps	C	F
Union Blvd. and 6th Ave. Eastbound Ramps	B	D
Union Blvd. and 4th Ave. (Gate 4)	C	F
Union Blvd. and 2nd Ave. (Gate 5)	D	E
Union Blvd. and 1st Ave.	A	C
Union Blvd. and Cedar Dr.	B	E
Union Blvd. and Alameda Ave.	F	F
Alameda Ave. and Urban Ave.	A	F
Alameda Ave. and Oak St. (Gate 7)	C	D
Alameda Ave. and Kipling St.	E	F
Kipling St. and Gate 1	A	B
Kipling St. and Gate 2	A	B
Kipling St. and 6th Ave. Frontage Rd.	B	C

Source: Matrix Design Group (2006)

4.11 Geology and Soils Impacts

The general methods, assumption, and definition of terms described in Subsection 4.4 apply to this resource topic.

It is assumed that standard erosion control, stormwater management, and fugitive dust control practices would be implemented for all construction/demolition activities associated with the Master Site Plan. Potential impacts to soil resources are assessed based on limitations associated with existing soil types and the extent of soil disturbances. Impacts are considered to occur if there is significant soil loss or disturbance resulting from demolition, construction, or landscaping activities, or if any existing soil limitations present constrains to

the implementation of the Master Site Plan that cannot be overcome through engineering and design. The following levels of impacts were considered:

- None—Implementation of the Master Site Plan results in no or a negligible loss, compaction, or degradation of soil at the Federal Center.
- Insignificant—Implementation of the Master Site Plan results in soil loss, compaction, or degradation at the Federal Center that detrimentally affects the existing on-site vegetation.
- Significant—Implementation of the Master Site Plan results in soil loss, compaction, or degradation at the Federal Center that leads to a loss of existing on-site vegetation. The existing soil limitations present development constraints to the implementation of the Master Site Plan that cannot be overcome through engineering and design.
- Beneficial—Implementation of the Master Site Plan has a positive effect on the soils of the Federal Center.

Some of the soil types that occur at the Federal Center may possess limitations that present development constraints. Of the seven soil types identified as occurring at the Federal Center, only the Ustic Torriothents soil unit is described as possessing limitations that present potentially significant development constraints. This soil unit occurs along the slopes of McIntyre Gulch on the eastern side of the Federal Center. Other soil units at the Federal Center also have potential to possess limitations that would require special engineering or design to overcome. Standard engineering testing for soil limitations is essential for any development activity at the Federal Center.

In the proposed Master Site Plan, all areas of the Federal Center with the Ustic Torriothents soil unit are designated as part of the open space district and would not be a location for future development. Therefore, the Master Site Plan would not be encumbered by the existing soil resources at the Federal Center. Implementation of the Master Site Plan is not anticipated to have any impacts on the existing soil units.

4.11.1 Action Alternatives

Given the scale of potential development under the Master Site Plan alternatives, no impacts to site geology would occur. Potential impacts to soils within the Federal Center site would be considered significant if soil loss, compaction, or degradation that would lead to a loss of existing on-site vegetation, was anticipated. The Ustic Torriothents soil unit is characterized by the most limiting factors of the soils found on site. This soil is located along the slopes of McIntyre Gulch on the eastern portion of the site, in areas designated as open space in both alternatives. Impacts related to these soils would therefore be negligible. Any current erosion or other soils issues should be evaluated and addressed during any future redevelopment of the site.

Appropriate best management practices would be implemented during clearing, grading, excavation, and construction activities to minimize potential erosion and sedimentation. A contamination monitoring and mitigation program should be implemented during the soil excavation and transport process. Full compliance with relevant resource agencies would occur and applicable permits would be obtained.

4.11.2 Mitigation

The construction contractor will adhere to the terms of the general permit to discharge stormwater associated with construction activities in accordance with the National Pollutant Discharge Elimination System Stormwater Permit requirements and guidelines. Best management practices will be implemented to control runoff, erosion, and sediment transport during and after construction. The development of the proposed project will comply with federal, state, and local regulations governing sediment and erosion control during construction activities.

A Stormwater Management Plan will be submitted to CDPHE and certified prior to proposed construction activities. CDPHE regulates the National Pollutant Discharge Elimination System Program and requires that a Notice of Intent be submitted at least 15 days before starting construction. The permit specifies that best management practices be used during construction and operation of the proposed project.

GSA has developed the *Denver Federal Center Draft Stormwater Management Plan* (GSA 2003) to comply with the requirements of their small municipal separate sewer system permit (MS4). This plan includes construction-related best management practices that would be implemented while the land is under the jurisdiction of the Federal government.

4.11.3 *No Action Alternative*

The land would continue to be owned by GSA and managed for potential limited development and open space, in accordance with existing plans for the Federal Center (GSA 1997). No impacts to geology and soils would therefore be expected in the short-term. Long-term geology and soil impacts could occur, however, if limited development were to occur. These impacts are not anticipated to be major.

~~No adverse or beneficial impacts related to soils would occur under the No Action Alternative.~~

4.12 Hazardous Materials Impacts

The general methods, assumption, and definition of terms described in Subsection 4.4 apply to this resource topic.

The office, retail, and residential uses that would be developed at the Federal Center under the Master Site Plan alternatives would not generate hazardous materials. While it is possible that certain laboratory or research and development uses could introduce hazardous materials to the site, future uses within the Federal Center would follow applicable laws and regulations for handling and disposing of hazardous materials, reducing the potential for contamination. This analysis, therefore, addresses potential impacts associated with known or potentially contaminated areas that currently exist within the Federal Center as described in Chapter 3, Subsection 3.7 3-8.

For the purposes of this analysis, a potential contaminant of concern (PCOC) is defined as an analyte detected at a concentration exceeding residential screening criteria or the screening criteria for the most sensitive ecological receptor. Although the majority of the Federal Center is planned for commercial, industrial, or recreational use, the more restrictive

residential standards were used to identify potential constraints. Some PCOCs may have been detected at concentrations suitable for commercial, industrial, or recreational reuse; therefore, there may be fewer restrictions on the Master Site Plan than currently anticipated.

Preliminary indications are that the existing soil, sediment, and surface water contamination on the eastern side of the Federal Center appears to be substantial, but soil, sediment, and surface water PCOC concentrations may be at levels suitable for non-residential reuse. If that is the case, the soil, sediment, and surface water PCOCs will have little to no impact on the reuse of the property. If, however, PCOC concentrations are at levels unsuitable for non-residential reuse, administrative and engineering controls may be necessary to mitigate risks.

Potential impacts for the two Master Site Plan alternatives were evaluated for each land use area. These areas include Mixed-use Core, Office Center, Federal Campus, Federal Quad, Federal Mall, Research and Development, Open Space, and Residential Neighborhood or Neighborhood Retail, depending on alternative. Development within contaminated areas of the Federal Center, e.g., building demolition, remediation in conjunction with site development activities, could result in the removal of contaminated soils, groundwater, or surface water/sediment prior to disturbance. Overall, both Master Site Plan alternatives offer opportunities to accelerate remediation of the site consistent with the Consent Agreements currently in place.

4.12.1 Federal Quad Alternative—Preferred Alternative

The environmental constraints with the potential to affect implementation of the Federal Quad Alternative are identified by land use area in Table 4-6. Under this alternative, soils, groundwater, surface water and sediment PCOCs within designated land use areas of the Federal Center could be disturbed. In addition, the installation of utilities, basements, and subsurface parking would likely require engineering controls in areas of groundwater contamination where groundwater is less than 10 feet below ground surface. The identified plumes, however, are located in the Federal Campus and Open Space areas where depth to groundwater is typically 10 to 30 below ground surface. To mitigate potential impacts related PCOCs during implementation of the Master Site Plan, specific appropriate engineering and land use controls will be applied.

4.12.2 Federal Mall Alternative

The environmental constraints with the potential to affect implementation of the Federal Mall Alternative are identified by land use area in Table 4-7. Under this alternative, soils, groundwater, surface water and sediment PCOCs within designated land use areas of the Federal Center could be disturbed. In addition, the installation of utilities, basements, and subsurface parking would likely require engineering controls in areas of groundwater contamination where groundwater is less than 10 feet below ground surface. However, the identified contamination plumes are located in areas of the Federal Campus and Open Space, where depth to groundwater is typically 10 to 30 below ground surface. To mitigate potential impacts related to PCOCs during implementation of the master plan, specific appropriate engineering and land use controls will be applied.

TABLE 4-6:
Environmental Conditions by Land Use Area, Federal Quad Alternative

Land Use Area	Key Issues
Mixed-Use Core	The depth to groundwater in the mixed-use core is 10–20 feet below ground surface. This area has known soil, sediment, and surface water contamination above residential reuse criteria. This area also includes railroad tracks, former transformer pads, and water, sanitary sewer, storm lines, and steam tunnels. Mitigation will be implemented as appropriate during construction.
Office Center	The depth to groundwater in the office center area is 5–30 feet below ground surface. This area has known soil and sediment contamination above residential reuse criteria. This area also includes landfill and debris burial areas, railroad tracks, former transformer pads, and water, sanitary sewer, storm lines, and steam tunnels. Mitigation will be implemented as appropriate during construction.
Federal Campus/ Federal Quad	The depth to groundwater in the federal campus is 5–61 feet below ground surface. This area has known soil, sediment and surface water contamination above residential reuse criteria. This area also includes a groundwater pump-and-treat facility, landfill and debris burial areas, storage tanks and associated pipelines, cyanide waste line, sump, and pits, a firefighting training area, railroad tracks, former transformer pads, and water, sanitary sewer, storm lines, and steam tunnels. Mitigation will be implemented as appropriate during construction.
Research and Development	The depth to groundwater in the research and development area is 10–30 feet below ground surface. This area has known soil and sediment contamination above residential reuse criteria. This area also includes areas of soil disturbance and fill of unknown origin, former transformer pads, and water, sanitary sewer, storm lines, and steam tunnels. Mitigation will be implemented as appropriate during construction.
Neighborhood Retail	The depth to groundwater in the neighborhood retail area is 15–25 feet below ground surface. Mitigation will be required during construction due to the water, sanitary sewer, storm lines, and steam tunnels that cross the area. Mitigation will be implemented as appropriate during construction.
Open Space	The depth to groundwater in the open space area is <5–30 feet below ground surface. This area has known soil, sediment and surface water contamination above residential reuse criteria. This area also includes landfill and debris burial areas, storage tanks and associated pipelines, areas of soil disturbance and fill of unknown origin, cyanide waste line, sump, and pits, railroad tracks, former transformer pads, and water, sanitary sewer, storm lines, and steam tunnels. Mitigation will be implemented as appropriate during construction.

* Soil concentrations above residential reuse criteria are the most restrictive cleanup standards; see text for additional information.

TABLE 4-7:
 Environmental Conditions by Land Use Area, Federal Mall Alternative

Land Use Area	Key Issues
Mixed-Use Core	The depth to groundwater in the mixed-use core is 5–30 feet below ground surface. This area has known soil and sediment contamination above residential reuse criteria. This area also includes landfill and debris burial areas, railroad tracks, former transformer pads, and water, sanitary sewer, storm lines, and steam tunnels. Mitigation will be implemented as appropriate during construction.
Office Center	The depth to groundwater in the office center area is 5–20 feet below ground surface criteria. This area has known soil, sediment, and surface water contamination above residential reuse. This area also includes railroad tracks, former transformer pads, and water, sanitary sewer, storm lines, and steam tunnels. Mitigation will be implemented as appropriate during construction.
Federal Campus/ Federal Mall	The depth to groundwater in the federal campus is 5–61 feet below ground surface. This area has known soil, sediment and surface water contamination above residential reuse criteria. This area also includes a groundwater pump-and-treat facility, landfill and debris burial areas, storage tanks and associated pipelines, cyanide waste line, sump, and pits, a firefighting training area, railroad tracks, former transformer pads, and water, sanitary sewer, storm lines, and steam tunnels. Mitigation will be implemented as appropriate during construction.
Research and Development	The depth to groundwater in the research and development area is 10–30 feet below ground surface. This area has known soil and sediment contamination above residential reuse criteria. This area also includes areas of soil disturbance and fill of unknown origin, former transformer pads, and water, sanitary sewer, storm lines, and steam tunnels. Mitigation will be implemented as appropriate during construction.
Residential Neighborhood	The depth to groundwater in the residential neighborhood area is 10–30 feet below ground surface. This area has known soil and sediment contamination above residential reuse criteria. This area also contains areas of soil disturbance and fill of unknown origin and water, sanitary sewer, storm lines, and steam tunnels. Mitigation will be implemented as appropriate during construction.
Open Space	The depth to groundwater in the open space area is <5–30 feet below ground surface. This area has known soil, sediment and surface water contamination above residential reuse criteria. This area also includes landfill and debris burial areas, storage tanks and associated pipelines, areas of soil disturbance and fill of unknown origin, cyanide waste line, sump, and pits, railroad tracks, former transformer pads, and water, sanitary sewer, storm lines, and steam tunnels. Mitigation will be implemented as appropriate during construction.

* Soil concentrations above residential reuse criteria are the most restrictive cleanup standards; see text for additional information

4.12.3 Mitigation

To minimize potential hazardous materials impacts at the Federal Center, several measures would be required as follows:

- Administrative controls (such as land use controls), engineering controls (such as slurry walls and dewatering measures), and/or additional investigation/evaluation efforts should be utilized to avoid and minimize potential hazardous materials impacts.
- Given the presence of known contamination, or the potential for unknown contamination, a materials management plan (MMP) and a health and safety plan should be developed and implemented for construction activities. If potentially contaminated soils and/or water are observed during construction or renovation activities, the procedures outlined in the MMP should be followed.
- Compliance with Consent Orders will continue.

4.12.4 No Action Alternative

Under the No Action Alternative, the environmental conditions described in Chapter 3, Subsection 3.7 3-8, would continue, and current engineering and land use controls would be maintained. Opportunities to accelerate remediation of the site as part of the development process would not be available under the No Action Alternative.

4.13 Hydrology and Water Quality Impacts

Rather than the general methods, assumptions, and definition of terms described in Subsection 4.4, this resource topic applies its own unique methods, assumptions, and definitions of terms.

The following impact thresholds were established to measure the relative changes in water quality (overall, localized, short term and long term, cumulative, beneficial and adverse) as a result of the alternative actions:

- Negligible—The impact to water resources would be localized and incalculable.
- Minor: The impact to water resources would be localized and calculable.
- Moderate—The effect on water resources would be calculable and would result in a change in water chemistry and/or biota over a relatively wide area or stream reach.
- Major—The effect on water resources would be calculable and would substantially change the water chemistry and/or biota over a large area or stream reach within and outside of the Federal Center.

Impacts are short-term when water quality recovers in less than 1 day. Long-term impacts occur when the recovery period is 30 days or more.

Assumptions made in the evaluation of impacts to hydrology and water quality include the following:

- ~~Standard erosion control and stormwater management practices would be implemented for all construction and demolition activities.~~
- ~~Full compliance with relevant resource agencies would occur and applicable permits would be obtained.~~
- ~~No activities would occur within the identified floodplains at the Federal Center site.~~
- ~~The Agricultural Ditch and Reservoir Company would be contacted for a license agreement prior to initiating any design or construction of any structure that would cross or be located adjacent to the ditch.~~
- ~~Impacts to water quality would be considered significant if water quality at the Federal Center or within the study area would be degraded to a level that exceeds any relevant regulatory threshold as a result of the implementation of the proposed action. Impacts to hydrology would be considered significant if implementation of the proposed action would result in a permanent alteration of existing hydrology on site or outside the boundaries of the Federal Center.~~

4.13.1 Federal Quad Alternative—Preferred Alternative

Under the Federal Quad Alternative, existing surface water features, including McIntyre Gulch, the Agricultural Ditch, and Downing Reservoir, would be incorporated as designated open space areas. Preservation and potential enhancement to these features would contribute to a positive impact on surface water features. Reconfiguration or relocation of existing detention ponds may be necessary to divert and support stormwater runoff in the immediate vicinity of the Federal Center and to accommodate potential increased runoff because the amount of impervious surfaces may increase. The proposed Master Site Plan improvements would not result in the alteration of drainages that would disrupt surface water flow.

Standard water quality control measures would be implemented to ensure the protection of water quality within the Federal Center and study area and minimize the potential for water quality impacts resulting from the Federal Quad Alternative. Water quality related to the presence of existing hazardous materials is addressed above in Subsection 4.12 4.8, Hazardous Materials Impacts.

4.13.2 Federal Mall Alternative

Under the Federal Mall Alternative, existing surface water features, including McIntyre Gulch, the Agricultural Ditch, and Downing Reservoir, would be incorporated as designated open space areas. Preservation and potential enhancement to these features would contribute to a positive impact on surface water features. Reconfiguration or relocation of existing detention ponds may be necessary to ensure adequate stormwater treatment capacity as a potential increase in impervious surfaces may cause increased runoff. The proposed Master

Site Plan improvements would not result in the alteration of drainages that would disrupt surface water flow.

Standard water quality control measures would be implemented to ensure the protection of water quality within the Federal Center and study area, and to minimize the potential for water quality impacts resulting from the Federal Mall Alternative. Water quality related to the presence of existing hazardous materials is addressed above in Chapter 4, Subsection 4.12 4-8, Hazardous Materials Impacts.

4.13.3 Mitigation

Assumptions made in the evaluation of impacts to hydrology and water quality include the following:

- Standard erosion control and stormwater management practices would be implemented for all construction and demolition activities.
- Full compliance with relevant resource agencies would occur and applicable permits would be obtained.
- No activities would occur within the identified floodplains at the Federal Center site.
- The Agricultural Ditch and Reservoir Company would be contacted for a license agreement prior to initiating any design or construction of any structure that would cross or be located adjacent to the ditch.
- Impacts to water quality would be considered significant if water quality at the Federal Center or within the study area would be degraded to a level that exceeds any relevant regulatory threshold as a result of the implementation of the proposed action. Impacts to hydrology would be considered significant if implementation of the proposed action would result in a permanent alteration of existing hydrology on site or outside the boundaries of the Federal Center.

4.13.4 No Action Alternative

Under the No Action Alternative, improvements to the Federal Center site would not be implemented; therefore, impacts to hydrology and water quality would not occur.

4.14 Vegetation Impacts

Rather than the general methods, assumptions, and definition of terms described in Subsection 4.4, this resource topic applies its own unique methods, assumptions, and definitions of terms.

To assess vegetation resources, available information for the Federal Center was compiled. Where possible, map locations of sensitive resources within the various land units were consulted. Analyzed resources, such as native vegetation communities, may occur in suitable habitat within the Federal Center, irrespective of ownership or managing agency. The

evaluated resources are recognized as part of the larger ecosystem. The following impact thresholds were established to measure the relative changes in vegetation as a result of the alternative actions:

- Negligible—No native vegetation (including riparian and wetland communities) would be affected, or some individual native plants could be affected as a result of the alternative, but there would be no measurable or perceptible changes in plant community size, integrity, or continuity.
- Minor—Effects on native plants, riparian communities, or wetlands would be measurable and perceptible, but would be localized within a small area. The viability of the plant community would not be affected, and the community, if left alone, would recover.
- Moderate—A change would occur over a relatively large area within native vegetation, riparian or wetland communities that would be readily measurable in terms of abundance, distribution, quantity, or quality.
- Major—Effects on native plant communities, riparian communities, or wetlands would be readily apparent and would substantially change vegetation community types over a large area.

Impacts to vegetation are short term if they could recover in fewer than 3 years or growing seasons. Long-term impacts would occur if vegetation would require more than 3 years or growing seasons to recover.

Impacts to vegetation resources on the Federal Center site would be considered significant if implementation of the preferred alternative ~~proposed action~~ would result in a loss of or degradation to unique or naturally occurring native plant communities that are relatively unmodified. In addition, the loss of a jurisdictional wetland would be a significant impact.

4.14.1 Federal Quad Alternative—Preferred Alternative

4.14.1.1 General Vegetation

Short-term construction-related impacts and long-term operational impacts to vegetation communities on the Federal Center site could occur if the Federal Quad Alternative were implemented. Existing grasslands would be preserved in open space areas, including in the southeastern portion of the site and perimeter open space areas. Because much of the Federal Center site has been previously developed or disturbed, vegetation impacts would be minimal.

4.14.1.2 Riparian Communities

Under the Federal Quad Alternative, riparian communities on the Federal Center site would be preserved and incorporated as part of designated open space areas, and would remain a valuable asset for both humans and wildlife alike. No adverse impacts would occur, therefore, to riparian communities as a result of implementation of the Federal Quad Alternative.

4.14.1.3 Wetlands

Potential impacts to wetlands within and around the Federal Center site could potentially result from construction activities or changes in the stormwater runoff patterns due to potential increase in impervious surfaces. Mitigation measures, such as erosion control practices and stormwater detention facilities, however, would minimize impacts to wetland resources.

Existing wetlands under the jurisdiction of USACE would be incorporated into the designated open space areas and would be protected. Small areas of non-jurisdictional wetlands associated with existing detention ponds may be eliminated through future development of the northwestern corner of the site. It is anticipated that other wetland communities may be enhanced to benefit both aesthetics and wildlife, however, and additional wetland areas would be created with new detention facilities. Overall, impacts to wetlands would be minimal.

Stormwater runoff volumes could potentially increase with the addition of the impervious surfaces associated with implementation of the new development. Installation of new stormwater control structures would improve the overall efficiency of the stormwater drainage system at the Federal Center site and would benefit both on-site wetlands and those hydrologically connected wetlands located outside the boundaries of the Federal Center site. Appropriate locations for detention facilities would be identified to replace any detention ponds removed during development and provide additional detention capacity as needed. Implementation of stormwater control measures would be coordinated with the City of Lakewood.

4.14.2 *Federal Mall Alternative*

4.14.2.1 General Vegetation

Short-term construction-related impacts and long-term operational impacts to vegetation communities on the Federal Center site could occur if the Federal Mall Alternative were implemented. Some existing grasslands would be preserved in open space areas, including in the southeastern portion of the site and perimeter open space areas, though to a lesser extent than the Federal Quad Alternative. In areas of temporary construction disturbance, restoration and weed control activities would minimize impacts. Because much of the Federal Center site has been previously developed or disturbed, vegetation impacts would be minimal.

4.14.2.2 Riparian Communities

Under the Federal Mall Alternative, riparian communities on the Federal Center site would be preserved and incorporated as part of designated open space areas, thereby remaining a valuable asset for both humans and wildlife alike. Therefore, preservation of these areas could result in a positive impact on riparian communities.

4.14.2.3 Wetlands

Potential impacts to wetlands within and around the Federal Center site could occur as a result of construction activities or changes in the stormwater runoff patterns. Mitigation measures, such as erosion control practices and stormwater detention facilities, however, would minimize impacts to wetland resources.

Existing wetlands under the jurisdiction of USACE would be incorporated into the designated open space areas and would be protected. Small areas of non-jurisdictional wetlands associated with existing detention ponds may be eliminated through future development of the northwest corner of the site. It is anticipated that other wetland communities may be enhanced to benefit both aesthetics and wildlife, however, and additional wetland areas would be created with new detention facilities. Overall, impacts to wetlands would be minimal.

Stormwater runoff volumes could potentially increase with the addition of the impervious surfaces associated with new development. Installation of new stormwater control structures would improve the overall efficiency of the stormwater drainage system at the Federal Center site and would benefit both on-site wetlands and those hydrologically connected but located the boundaries of the Federal Center site. Appropriate locations for detention facilities would be identified to replace detention ponds removed during development and provide additional detention capacity as needed. Implementation of stormwater control measures would be coordinated with the City of Lakewood.

4.14.3 Mitigation

In areas of temporary construction disturbance, restoration of impacted vegetation and implementation of weed control measures would minimize overall impacts.

4.14.4 No Action Alternative

Under the No Action Alternative, impacts to riparian or wetland communities would not occur as a result of improvements to the Federal Center site. Any already planned projects would incorporate mitigation that would keep impacts to general vegetation to a minimum.

4.15 Wildlife Impacts

Rather than the general methods, assumptions, and definition of terms described in Subsection 4.4, this resource topic applies its own unique methods, assumptions, and definitions of terms.

To assess wildlife resources, the available information for the Federal Center was compiled. Where possible, map locations of sensitive resources within the various land units were consulted. Habitats extend beyond the boundary of the Federal Center and the evaluated resources are recognized as part of the larger ecosystem. The analyses of impacts include lands within the Federal Center as well as within the larger area of study area as stated. The

following impact thresholds were established to measure the relative changes in wildlife resources as a result of the alternative actions

- Negligible—Wildlife, including native fish, and their habitats would not be affected or the effects would be at or below levels of detection and would not be measurable or of perceptible consequence to wildlife populations. Impacts would be within the range of natural variability.
- Minor—Effects to wildlife or habitats would be measurable or perceptible, but localized within a small area. While the mortality of an individual animal might occur, the viability of wildlife populations would not be affected, and the population, if left alone, would recover.
- Moderate—Effects to wildlife populations or habitat would occur over a relatively large area. The change would be readily measurable in terms of abundance, distribution, quantity, or quality of population. A change would occur over a relatively large area within native vegetation, riparian or wetland communities that would be readily measurable in terms of abundance, distribution, quantity, or quality.
- Major—Effects to wildlife populations or habitats would be readily apparent and would substantially change wildlife populations over a large area within or outside the proposed lands. Impacts to wildlife are short term if they could recover in less than one year and in less than three years. Long-term impacts would occur if wildlife would require more than one year to recover.

Potential impacts to wildlife and wildlife habitats were assessed based on the proposed land uses and development areas associated with each alternative. Direct impacts could potentially occur as a result of direct disturbances to habitats or individuals, particularly during the construction phase of the project. Indirect impacts to wildlife could occur as a result of new activities at the improved Federal Center site. Impacts would be considered significant if a loss of multiple or unique wildlife habitat areas occurred or if there were a loss in wildlife that impairs the sustainability of wildlife populations at the Federal Center site.

4.15.1 Federal Quad Alternative—Preferred Alternative

Existing riparian and wetland areas within the Federal Center site that provide high-quality habitat are largely located outside of areas proposed for future development and intensive use, so impacts to these existing habitat areas would not result. Implementation of the Federal Quad Alternative would result in the enhancement of wildlife habitat through the provision of approximately ~~230~~ 229 acres of newly designated open space. This open space plan would also serve to protect the majority of riparian and wetlands areas on the Federal Center site, benefiting wildlife that use these areas. McIntyre Gulch, Agricultural Ditch, and Downing Reservoir would all continue to provide high-value habitat for nesting birds, denning mammals, and waterfowl. Some disturbance of wildlife could potentially occur in designated urban open space areas where human activities increase or the types of activities change; however, given the suburban location of the Federal Center, potential impacts would be negligible as most species are already accustomed to some level of human activity.

Proposed development in the northwestern portion of the Federal Center site could result in the loss of wetlands and associated wildlife habitat at existing detention ponds; however, new detention ponds installed to handle increased stormwater runoff would be designed to support quality wetlands and wildlife habitat. This would result in no net loss of this type of habitat and create a beneficial effect from a potential increase in wetland habitat.

Other already developed or disturbed areas of the Federal Center site provide habitat for species such as black-tailed prairie dogs and rabbits. Proposed development in these areas would impact those species inhabiting them, especially in the western portion of the site where cumulative impacts from the St. Anthony Hospital and RTD development projects would impact prairie dog habitat.

Avian species would potentially be affected by removal of nesting habitat. Tree removal would be minimized to the extent practicable, however, to protect avian habitat.

Overall, implementation of the Federal Quad Alternative would protect the existing highest quality habitat areas. The large amount of open space areas planned in this alternative would benefit wildlife habitat resources. Though some impacts to individuals or habitats would likely occur, mitigation measures would ensure that wildlife populations would continue to be an asset of the Federal Center site.

4.15.2 Federal Mall Alternative

Under the Federal Mall Alternative, existing riparian and wetland areas within the Federal Center site would be located outside of areas proposed for development and included in areas designated for open space preservation and thereby maintained. Approximately ~~192~~ 193 acres of newly designated open space would be preserved or enhanced under this alternative, the majority of which would provide habitat for wildlife.

Some disturbance of wildlife could potentially occur in designated urban open space areas where human activities increase; however, given the suburban location of the Federal Center site, potential impacts would be negligible.

Proposed development in the northwestern portion of the Federal Center site could result in the loss of wetlands and associated wildlife habitat at the existing detention ponds; however, new detention ponds installed to handle stormwater runoff could be designed to support quality wetlands and wildlife habitat.

Other already developed or disturbed areas of the Federal Center site provide habitat for species such as black-tailed prairie dog and rabbits, but these areas have been altered by human activities and do not provide particularly high wildlife habitat value for other species. Proposed development in these areas would impact black-tailed prairie dogs, especially in the western portion of the site, adjacent to cumulative impacts from the St. Anthony Hospital and RTD development. Throughout the site, tree removal would be minimized to the extent practicable to protect avian habitat.

Overall, implementation of the Federal Mall Alternative would protect the majority of the existing highest quality habitat areas associated with drainages and ponds. Though some impacts to individuals, prey sources, or habitats would likely occur, mitigation measures would ensure that wildlife populations would continue to be an asset of the Federal Center site.

4.15.3 Mitigation

Mitigation under either action alternative should include preparation of a wildlife management plan to address specific species and geographic locations within the Federal Center. The wildlife management plan should include:

- Providing locations for populations of black-tailed prairie dogs to remain in designated open space areas such as the southeastern corner of the site. Some management of these populations would likely be necessary to prevent human-wildlife conflicts in recreation areas and to mitigate damage to underground utilities adjacent to buildings.
- Minimizing tree removal to protect tree-nesting species. Along the Agricultural Ditch and McIntyre Gulch, retention of larger trees should be considered when practical to aid in the prevention of bank erosion. Prior to removal of trees during nesting season for any tree-nesting species protected under the MBTA, surveys should be conducted to ensure that take of an active nest does not occur.
- Preserving the active nests of protected ground-nesting species. For example, vegetation surrounding retention pond could be enhanced to provide additional cover for waterfowl and other wildlife.
- Examining the potential to restore areas to native grasses that could enhance immediate foraging opportunities for nesting raptor should also be considered to enhance wildlife conditions on the site.

Future planning could examine in more detail other opportunities ranging from the development of an education program that could help mitigate conflicts between wildlife and facility personnel to vegetative enhancements that would provide improved wildlife habitat. Specific consideration should be given to enhancing the upland vegetation south of Downing Reservoir to maintain natural space connectivity to McIntyre Gulch.

4.15.4 No Action Alternative

Under the No Action Alternative, impacts to wildlife and wildlife habitat on the Federal Center site would not occur as a result of improvements associated with the Master Site Plan. Habitat along drainages and around ponds would continue to be maintained; however, the opportunity to enhance or preserve these areas would not be realized. Impacts would still result from other nearby projects, including the St. Anthony Hospital and RTD developments.

4.16 Threatened, Endangered, and Sensitive Species

Rather than the general methods, assumptions, and definition of terms described in Subsection 4.4, this resource topic applies its own unique methods, assumptions, and definitions of terms.

As mentioned in Chapter 3, Subsection ~~3.11~~ 3.12, none of the listed or candidate species has been observed on the Federal Center site. Moreover, the site does not provide suitable habitat for regular occurrence of any of these species. Neither action alternative would affect these species or their habitats, and nor would the No Action Alternative.

4.16.1 Mitigation

Mitigation for federally listed species includes ongoing communication with USFWS to ensure that future development does not impact these species or any species that may be listed in the future.

4.17 Cultural Resources Impacts

Rather than the general methods, assumptions, and definition of terms described in Subsection 4.4, this resource topic applies its own unique methods, assumptions, and definitions of terms.

The following discussion applies to historic and archaeological resources. The National Historic Preservation Act (NHPA), as amended (16 USC 470 et seq.), NEPA, and GSA Order ADM 1095.1F (October 19, 1999) require the consideration of impacts to historic properties. Potential impacts to archaeological and historic resources within the Area of Potential Affect include direct and indirect impacts. Direct impacts are caused by the action and occur at the same time and place; indirect impacts are caused or influenced by the action and occur later in time or are farther removed in distance, but are still reasonably foreseeable. Cumulative impacts result from the incremental impact of the action when added to other past, present, or future actions. The terms “impacts” and “effects” are synonymous under NEPA and NHPA, respectively. The physical displacement, demolition, or alteration of a resource is a direct impact; changes in the use, operation, or character of a resource may either be direct or indirect; and changes to the visual context are considered indirect impacts.

In the event that an action may affect a historic property, the lead agency must enter into consultation with the State Historic Preservation Officer, and other interested agencies and individuals to identify historic properties that could potentially be affected, assess potential adverse effects, and resolve the adverse effects through mutually agreed upon mitigation measures.

The term “historic property” is defined in the NHPA (16 USC §470(w)(5)) as any prehistoric district, site, building, structure, or object included in, or eligible for inclusion on the National Register of Historic Places.” Section 101 (b)(4) of NEPA stresses the importance of preserving “important historic, cultural, and natural aspects of our national heritage...” (emphasis added). Section 106 of the NHPA stipulates that:

The head of any federal agency having direct or indirect jurisdiction over a proposed federal or federally assisted undertaking in any state and the head of any federal department or independent agency having authority to license any undertaking shall, prior to the approval of the expenditure of any federal funds on the undertaking or prior to the issuance of any licenses, as the case may be, take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register.

The regulations implementing the NHPA (36 CFR 800) encourage federal agencies to consider their Section 106 responsibilities as early as possible in the NEPA process and to plan their public participation, analysis, and review in such a way that they can meet the purposes and requirements of both statutes in a timely and efficient manner.

According to the Criteria for Evaluation shown at 36 CFR 60.4, cultural resources are evaluated for nomination to the National Register as summarized below:

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and

- a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
- b) that are associated with the lives of persons significant in our past; or
- c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- d) that have yielded, or may be likely to yield, information important in prehistory or history.

Integrity is the “ability of a property to convey its significance.” To retain historic integrity, a property will always possess several, and usually most, of the seven aspects. Eligible sites are those that satisfy one or more of the aforementioned criteria and retain integrity. Non-eligible sites are those that do not satisfy any of the evaluation criteria and/or lack integrity.

4.17.1 Archaeological Resource Impacts

4.17.1.1 Federal Mall and Quad Alternatives

Because the Federal Center has undergone extensive landscape transformation since its inception, it is unlikely that the implementation of either alternative would uncover intact archaeological resources. In addition, there would be no construction activity in the McIntyre

Gulch or the Downing Reservoir, where there is the potential for prehistoric archaeological resources. Adverse affects to archaeological resources are therefore unlikely.

4.17.1.2 Mitigation

In the event that archaeological resources are encountered during construction activities, an evaluation of their significance should be undertaken.

4.17.1.3 No Action Alternative

Under the No Action Alternative, the Master Site Plan would not be implemented, so no impacts to archaeological resources would occur.

4.17.2 Historic Resource Impacts

4.17.2.1 Federal Quad Alternative

Because Building 710 is within a portion of the site that is being preserved as Federal Campus, it would not be expected to be adversely affected by the implementation of the Federal Quad Alternative. The Quonset Hut is an isolated structure, partially underground. Because it would be preserved within the new R&D district, it should not be affected by the proposed improvements. This alternative would not adversely affect historic resources determined eligible or listed in the National Register.

4.17.2.2 Federal Mall Alternative

Because Building 710 is within a portion of the site that is being preserved as Federal Campus, it would not be expected to be adversely affected by the implementation of the Federal Mall Alternative. The Quonset Hut is an isolated structure, partially underground. Because it would be preserved within the new R&D district, it should not be affected by the proposed improvements. There would be no adverse effects to historic resources determined eligible or listed in the National Register.

4.17.2.3 Mitigation

Under the Federal Quad and Mall alternatives, implementation of either action alternative would include a more detailed site- and project-specific assessment of any potential affects on possible cultural resources.

4.17.2.4 No Action Alternative

Under the No Action Alternative, the Master Site Plan would not be implemented on the Federal Center site, so there would be no impacts to historic resources.

4.18 Visual Resource Impacts

Rather than the general methods, assumptions, and definition of terms described in Subsection 4.4, this resource topic applies its own unique methods, assumptions, and definitions of terms.

The area of visual influence as described in Subsection Section 3.13 3.13.3 provides the context for assessing visual impacts resulting from implementation of the Master Site Plan. Impacts to identified views and vistas were determined based on an analysis of the existing quality of the landscape in the view, the sensitivity of the view, and the anticipated relationship of the scale and massing of the proposed buildings to the existing visual environment.

Visual impacts in the analysis presented below are described in the following categories:

- No visual impact—The proposed development would not be visible from the representative viewpoint.
- Minor visual impact—The proposed development would be visible as a background element of a view that includes buildings of similar mass and scale. The proposed development would not interfere with views from the representative viewpoint and would not change the character of the existing view.
- Moderate visual impact—The proposed development would be visible as part of a view that includes buildings of similar mass and scale and interferes with views from representative viewpoint without changing the character of the existing view.
- Major visual impact—The proposed development would be visible as a contrasting or dominant element that interferes with views from the representative viewpoint and substantially changes the character of the existing view.
- Positive visual impact—The proposed development improves a view or the visual appearance of an area.

4.18.1 Federal Quad Alternative—Preferred Alternative

The Federal Quad Alternative would replace the irregular street edges of the central core area with a series of mid-scale signature buildings sited around an oval open space, the Federal Quad (Exhibits 4-3 and 4-4). The diagonal grid that currently exists within the central core area would be maintained, but the Quad would connect the diagonal grid to the orthogonal grid to the west through an important vista along a boulevard connecting the transit station to the Federal Quad. Buildings within the Mixed-Use Core would step down in height towards the greenspaces at both the Federal Quad and the transit station, framing the open spaces at a pedestrian scale.

A more regular grid would be established in the western portion of the Federal Center site to create new visual connections between the site and the streets bisecting Union Boulevard.

The scale and massing of development at the western end of the site would be consistent with development outside of the site along Union Boulevard. Certain views of the distant foothills of the Rocky Mountains to the west would be provided from the Office Center district, portions of the Mixed-Use Core district, and the RTD and St. Anthony Hospital project sites. At the eastern end of the site, views would be maintained of the Denver skyline.

The replacement of an area of haphazard development, set within a somewhat sparse landscape, with a series of office buildings and wide boulevards visually connected to the neighborhood to the west would result in a positive impact. Impacts to the north would be minor, because 6th Avenue is a wide highway and a green buffer would be maintained along the northern edge of the site. Impacts to the southern portion of the site and its adjacent neighborhood would be minor, because the majority of the area would be open space and the neighborhood retail area would be confined to a small area. Finally, impacts to the eastern portion of the site and the adjacent neighborhoods would be minor, because the open space would be preserved along the eastern side of the site and the denser development proposed for the western end of the site would be partially shielded by the existing buildings within the Federal Center site.

Overall, the implementation of the Master Site Plan would enhance the visual connections between distinct functional areas of the site. In addition, major views of the Rocky Mountains and the Denver skyline would also be preserved.

4.18.2 Federal Mall Alternative

The Federal Mall Alternative would replace the irregular street edges of the central core area, and the more random development to the west of the central core area, with a series of mid-scale signature buildings sited along a landscaped boulevard, the Federal Mall (Exhibits 4-5 and 4-6). The Federal Mall would be wide, bordered on the north by a park and include a hardscaped plaza. To the northeast, the vista along the Federal Mall and adjacent Center Street would terminate at a prominent federal building. The diagonal grid that currently exists within the central core area would be maintained, but the Federal Mall would curve at its western end, connecting the diagonal grid to the orthogonal grid to the west.

At the western end of the site, a more regular grid would be established, creating new visual connections between the site and the streets outside of the site. Certain views of the foothills of the Rocky Mountains to the west would be provided from the Mixed-Use Core district and the RTD and St. Anthony Hospital project sites. At the northwestern corner of the site, another tall building is envisioned to visually complement Building 67. These two buildings would dominate views from 6th Avenue near Union Boulevard.

At the southeastern corner of the site, near the intersection of 7th Street and Alameda Avenue, there would be a multi-family residential neighborhood that would alter the current open visual character of this portion of the site. At the eastern end of the site, important views to the east of the Denver skyline would be maintained.

Exhibit 4-3: Vista to the Northwest along Center Street, including the Federal Quad



Exhibit 4-4: Vista to the East from the Transit Station Area toward the Federal Quad (in distance)

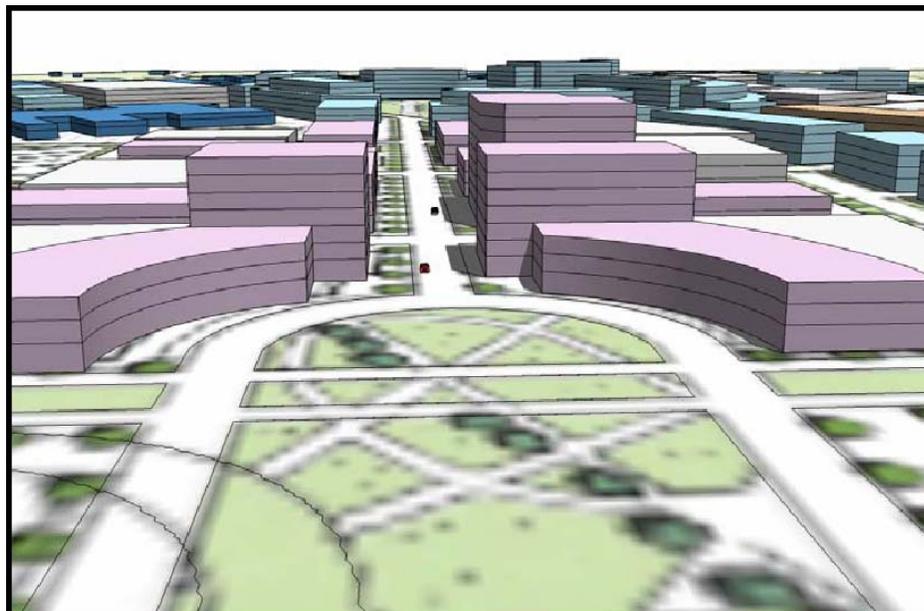
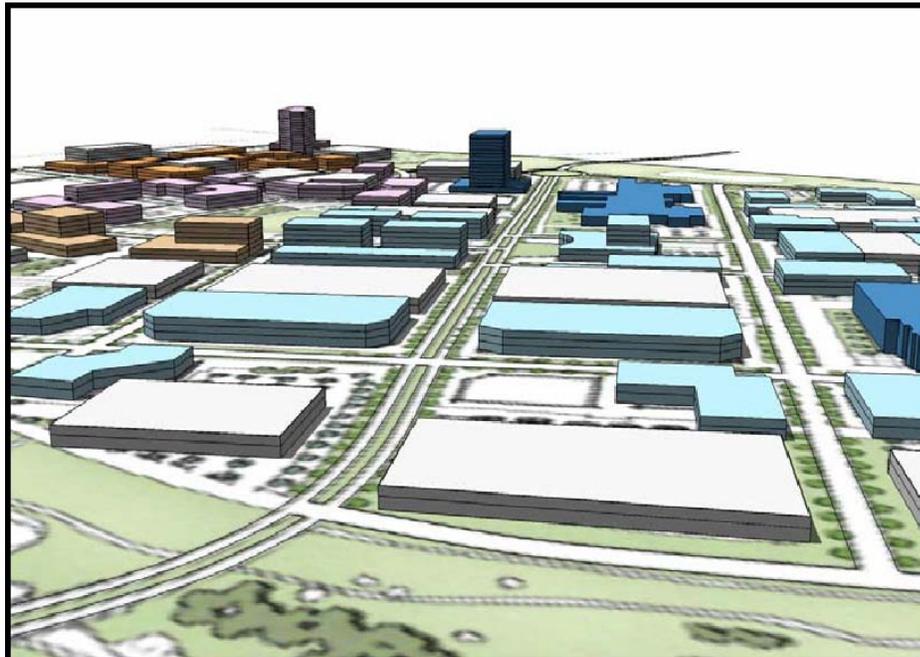


Exhibit 4-5: Looking Northeast along Center Street toward the Federal Core



Exhibit 4-6: Looking Northwest along 6th Street from the Federal Core toward the Office Center (in distance)



The replacement of an area of haphazard development, set within a somewhat sparse landscape, with a series of office buildings and wide boulevards visually connected to the neighborhood to the west would result in a positive visual impact. Impacts to the north would be minor, because 6th Avenue is a wide highway and a green buffer would be maintained along most of the northern edge of the site.

Impacts to the southern portion of the site and its adjacent neighborhood would be moderate, because an area of open space would be replaced by dense residential development. Impacts to the eastern portion of the site and the adjacent neighborhoods would be minor, because the open space would be preserved along the eastern side of the site and the denser development proposed for the western end of the site would be partially shielded by the existing buildings within the Federal Center site.

Overall, the implementation of the action alternatives would enhance the visual connections between distinct functional areas of the site. Major views of the Rocky Mountains and the Denver skyline would also be preserved.

4.18.3 Mitigation

The following measures should be implemented to mitigate potential visual resource impacts:

- At the edges of the site, perimeter security barriers should be minimized and employed only when the use necessitates it. Otherwise, physical connections and associated vistas should be enhanced between the Federal Center site and the surrounding neighborhoods.
- Trees should be planted along roadways to maintain the green character of the site and alter the visual character of the immediate area.

4.18.4 No Action Alternative

Under the No Action Alternative, the Master Site Plan would not be implemented at the Federal Center site. The overall positive impacts resulting from the improvement of the visual character of the Federal Center site would therefore not occur. The RTD Intermodal Station and St. Anthony Hospital, however, would still be constructed in the western portion of the site.

4.19 Air Quality Impacts

The general methods, assumption, and definition of terms described in Subsection 4.4 apply to this resource topic.

A proposed project would be expected to result in a significant adverse air quality impact if the activities associated with construction or operation result in deterioration in air quality leading to a violation of the NAAQS. Impacts to air quality would occur to a lesser extent as a result of short-term construction activities and localized traffic generated during operation.

Potential air quality impacts related to proposed projects in the vicinity of the Federal Center have been analyzed in depth in the following documents: *Environmental Assessment, Potential Development of the Western Portion of the Denver Federal Center* (GSA 2005a) and the *Final West Corridor Environmental Impact Statement* (RTD 2003).

The *Environmental Assessment, Potential Development of the Western Portion of the Denver Federal Center* (GSA 2005a) concluded that “there would be negligible to minor short-term adverse impacts to air quality as a result of the construction, and negligible long-term adverse impacts to air quality from operation of, the proposed hospital sites and transit station/TOD. These impacts would not cause violations of the NAAQS.”

Aside from the proposed redevelopment of the Federal Center, the construction of the St. Anthony Hospital project and the construction and operation of the proposed light rail transit project are the largest known proposed projects at the Federal Center. Implementation of the Master Site Plan would result in both residential and employment growth at the Federal Center over a multi-year timeframe. The potential air quality impact of this growth would be expected to be similar to the air quality impact of other similarly sized redevelopment projects occurring in the Denver metropolitan area. It is therefore expected that the potential local and regional air quality impacts related to implementation of the Master Site Plan would be qualitatively similar to the impacts described in the above-listed documents, and the impacts are not expected to cause violations of the NAAQS.

Impacts on air quality that could result from implementation of the Federal Center Master Site Plan could vary depending on the alternative selected and the intensity and pace of future development, particularly during construction, regardless of which development alternative is selected.

This analysis evaluated the potential impacts on air quality that would result from road and building construction, vehicular trips during both construction and operation, and emissions from heating and cooling, water heating, and other miscellaneous sources of air pollution, including backup generators. Air quality modeling was not conducted as part of this analysis, so the potential impacts are discussed qualitatively.

An intersection-level air quality analysis was, however, conducted as part of the West Corridor EIS for the intersection of Union Boulevard and 4th Avenue for traffic entering and exiting the Cold Spring/Federal Center park-n-Ride lot. In spite of the high traffic volumes and heavy congestion currently associated with that intersection (the highest traffic volumes for arterials within the study area), the modeling indicated that there would be no anticipated violations of the 1-hour or the 8-hour carbon monoxide NAAQS at that intersection (RTD 2003, page 5-178).

In addition, a conformity analysis performed on the Fiscally Constrained 2030 Regional Transportation Plan, which includes the West Corridor project and other transportation projects, demonstrated that the Denver metropolitan area has implemented all adopted transportation control measures and meets all federally prescribed emission tests (DRCOG 2006, page 110). Based on the 2006 conformity analysis, the Denver area was is-expected to demonstrate continued attainment with the NAAQS for CO, PM₁₀, nitrogen oxide (NO_x), and

ozone. Future conformity analyses will need to take into account the likely redesignation of the region as a nonattainment area as well as the control measures to be developed as part of the state implementation plan for ozone.

4.19.1 Summary of Air Quality Conformity Analysis

An air quality conformity analysis was prepared for the two action alternatives. The conformity analysis was conducted for CO, VOC, and NO_x generated by the expected motor vehicle trips at project build-out in 2030.

Data on trip generation under each of the Federal Center alternatives were taken from the Lakewood West Central Subarea Transportation Study, Final Report (Matrix Design Group 2007). Table 4-8 summarizes the trip generation data for each alternative.

TABLE 4-8:
Trip Generation Rates for each Alternative

Alternative	Year	Total Trips
Baseline	2007	15,900
2015—Federal Center	2015	15,369
Federal Mall Alternative	2030	75,577
Federal Quad Alternative	2030	61,319

Source: Matrix 2007, Table 3, page 13.

For the air quality emission calculations, 80 percent of the trips were assumed to be home-work trips, 20 percent were assumed to be non-home based (lunch) trips. Table 4-9 summarizes the trip types, distances, and assumptions used for the calculations.

TABLE 4-9:
Trip Types and Distances

Trip Type	Percentage (assumed)	Trip Distance (miles)
Home-work trips	80%	10.7
Non-home based trip (lunch trips)	20%	5.9

Source: Spotts 2007.

Table 4-10 presents a summary of the results of the emission calculations for each of the alternatives. Emission factors for CO, VOCs, and NO_x were provided by the state of Colorado Air Pollution Control Division on September 24 and 25, 2007 (Macrae 2007).

As shown in Table 4-10, the calculated emissions for VOCs and NO_x are below the general conformity de minimis levels. Conformity is therefore demonstrated for these pollutants. Emissions of carbon monoxide from motor vehicles, however, are anticipated to exceed the de minimis levels for both the Federal Mall Alternative and the Federal Quad Alternative. To demonstrate conformity for this project, it is recommended that GSA work closely with the

TABLE 4-10:
Summary of Emission Calculations for Denver Federal Center Alternatives

Alternative	Year	CO (tons/year)	VOCs (tons/year)	NO_x (tons/year)
Baseline	2007	746	44	55
2015—Federal Center	2015	536	24	26
Federal Mall Alternative	2030	2,004	76	59
Change from Baseline		1,258	32	4
Exceeds de minimis (100 tons)		Yes	No	No
Federal Quad Alternative	2030	1,626	62	48
Change from Baseline		880	18	-7
Exceeds de minimis (100 tons)		Yes	No	No

City of Lakewood, DRCOG, and the state of Colorado Air Pollution Control Division to demonstrate that these projected increases in traffic and emissions associated with this project are included in the State Implementation Plan and that all proposed roadway improvements are included in the Fiscally Constrained Regional Transportation Plan.

4.19.2 Construction Impacts—Action Alternatives

Construction of roadways, buildings, and other features associated with implementation of the Master Site Plan could result in localized, minor, short-term impacts to air quality. The use of heavy-duty, off-road, gasoline- and diesel-powered equipment would generate emissions of air pollutants that would include CO, particulates (PM₁₀ and PM_{2.5}), NO_x, sulfur oxides, and VOCs. Additional emissions would result from vehicles construction workers use to travel to and from the site. Ground disturbance associated with construction activities would result in emissions of fugitive dust. The emissions associated with construction activities would be short term and are not expected to measurably impact regional air quality or lead contribute significantly to exceedances of the NAAQS.

Emissions associated with construction are directly related to the size of the disturbed area and the number and types of construction equipment operating at a given time. Therefore, emissions in a specified time period (day, month, or year) would be dependent on the pace, intensity, and extent of construction activity during that period. If intensive construction were to occur within a relatively short timeframe (3–5 years) and cover a large area, the local air quality impacts would be greater than if construction were spread out over a 10-year (or greater) period. Assuming that the disturbed areas and the pace of construction would occur over a 5- to 20- year timeframe for each of the action alternatives, the air quality impacts associated with construction of each of the alternatives would be minor.

4.19.3 Construction Impacts—No Action Alternative

Under the No Action Alternative, the Master Site Plan would not be implemented at the site and there would be no impacts from construction of Master Site Plan elements. Cumulative impacts from other planned projects such as the St. Anthony Hospital and RTD transit projects would include short-term minor impacts during construction.

4.19.4 Operational Impacts

Primary air quality impacts from the operation of the Federal Center are projected to be automobile-related emissions from employee and visitor vehicular traffic and building-related emissions from heating and cooling, water heating, and other miscellaneous emission sources, including backup generators.

As described in Chapter 1 of this EIS, the Federal Center currently contains approximately ~~65~~ 50 buildings that encompass approximately 4.1 million square feet of office, warehouse, laboratory, and special use space. In addition, more than 6,000 federal employees are currently located at the Federal Center. These numbers serve as a baseline from which to measure the relative impacts of each of the proposed alternatives.

4.19.4.1 Action Alternatives

The Federal Quad Alternative would result in the planned development of an additional 1,800,000 square feet of federal facilities and approximately 1,645,000 square feet of new office, R&D, and retail space. The number of employees under this scenario would increase by approximately 8,424 over current levels. This alternative also plans for 1,400 ~~290~~ residential units and a mid-sized (200-room) hotel.

The Federal Mall Alternative would result in the planned development of 2,000,000 square feet of new federal facilities and approximately 1,646,500 square feet of new office, R&D, and retail space. More specifically, under this alternative, there would be an increase in the amount of space devoted to office use and retail activities relative to space devoted to R&D uses. The number of employees under the Federal Mall Alternative would increase by approximately 9,242 over current levels. ~~There would be 1,400 residential units under this alternative compared with 290 residential units under the Federal Quad Alternative.~~

As a more intensive development option, the Federal Mall Alternative would have a slightly greater long-term impact on air quality than the Federal Quad Alternative. This greater impact is a result of the following individual components:

- Addition of approximately 200,000 additional square feet of commercial and federal space would result in greater emissions from space and water heating systems.
- Based on the amount of developed space, it is projected that there would be 818 more on-site employees under the Federal Mall Alternative compared with the Federal Quad Alternative. Emissions would be generated primarily as a result of employees commuting

to work by car. These emissions would be reduced if employees used the light rail system or other alternative modes of transportation.

- The greater number of residential units would also result in additional emissions from space and water heaters and additional vehicle trips generated by new residents.

As a result of the proposed intersection improvements at Union Boulevard and 4th Avenue, LOS under both of the action alternatives would be better at this intersection than under the No Action Alternative. The intersection currently operates at LOS-F during the evening peak hour, and the LOS at the intersection was not expected to improve under either the No Action Alternative or the LRT Alternative (RTD 2003). However, with the intersection improvements proposed as part of the Federal Center Master Site Plan, LOS under the Federal Quad Alternative is projected to be LOS-D and under the Federal Mall Alternative LOS is projected to be LOS-E. Both of these conditions represent an improvement over baseline. Improving traffic flow through an intersection typically results in reduced congestion and reduced air pollutant concentrations. It is therefore expected that carbon monoxide concentrations at the Union Boulevard/4th Avenue intersection would be lower than those reported in the *Final West Corridor Environmental Impact Statement*.

Overall, the Federal Mall Alternative would have a slightly greater long-term impact on air quality than the Federal Quad Alternative. However, neither alternative would be expected to result in a measurable deterioration of regional air quality or lead-contribute significantly to a violation of the NAAQS.

Although the population and employment growth projected for the Federal Mall and the Federal Quad alternatives is not specifically identified in the Fiscally Constrained 2030 Regional Transportation Plan conformity analysis (DRCOG 2006), the overall population and employment projections for the St. Anthony Hospital project, the RTD Intermodal Station transit facility, and for both of the action alternatives is consistent and well within the regional growth that was identified in the analysis. Based on that 2006 conformity analysis, the Denver metropolitan area was is projected to continue to meet the national air quality standards. Future conformity analyses will need to take into account the likely redesignation of the region as a nonattainment area as well as the control measures to be developed as part of the state implementation plan for ozone. Once committed funding sources for the widening of Kipling and Alameda have been identified, these roadway improvement projects can be included in future fiscally constrained conformity analyses. Both construction and long-term emissions from implementation of the action alternatives could be minimized through the application of the mitigation measures described below.

In terms of cumulative impacts, the RTD Intermodal Station ~~high rail station~~ is not expected to substantially increase air emissions in the region. The presence of the future light rail station on site would likely encourage many residents, employees, and visitors to use mass transit, thus reducing potential air quality impacts due to vehicle use. A well-designed, mixed-use, transit-oriented center surrounding the light rail station would greatly enhance transit use, which would in turn reduce the overall air quality impact of the proposed development. The relocation of St. Anthony Hospital would not be expected to result in a significant increase in air emissions; however, the source of emissions would be moved from

its current location in Denver to its proposed location near the Federal Center. Overall, cumulative impacts on air quality and visibility would be minor and on a local level.

4.19.4.2 No Action Alternative

There would be no impacts from the No Action Alternative that would increase air emissions above ambient conditions. Cumulative impacts from other planned projects such as St. Anthony Hospital and RTD transit projects would continue to be minor and on a local level.

4.19.5 Mitigation

A construction permit and fugitive dust control plan would be required from the Colorado Department of Public Health and Environment Air Pollution Control Division if any construction activity on the Federal Center property would exceed 25 acres in size or 6 months in duration. The fugitive dust control plan would describe measures the contractor would take to reduce emissions of fugitive dust during construction. Possible mitigation measures and standard construction procedures to reduce fugitive dust include application of water to disturbed areas, control of vehicle speeds on unpaved roads, and reducing dirt “carryout” onto paved surfaces. Emissions from construction equipment could be minimized through the use of low-sulfur fuel and by maintaining the equipment in good operating condition. In addition, contractors could be required to use the cleanest “tier” of construction equipment available. Phase in of EPA Tier 2 and 3 off-road engine standards began in 2001 and will continue through 2008. EPA Tier 4 standards will be phased in between 2008 and 2015.

New buildings constructed at the Federal Center would likely incorporate new energy efficiency technologies into the building design that would minimize long-term air quality impacts from facility operations. Water heating and space heating equipment would be required to meet efficiency requirements and emission limits in place at the time of installation.

4.20 Noise and Vibration Impacts

Rather than the general methods, assumptions, and definition of terms described in Subsection 4.4, this resource topic applies its own unique methods, assumptions, and definitions of terms.

A proposed development project would result in an adverse noise or vibration impact if it resulted in conditions that violated established noise guidelines or if there are long-term increases in the number of people highly disrupted by the noise/vibration environment. Adverse impacts would also occur if there are noise-associated adverse health effects to individuals, or if there are unacceptable increases to the noise environment for sensitive receptors. A sensitive receptor is any person or group of persons in an environment where low ambient noise levels are expected, such as schools, daycares, hospitals, and nursing homes. A development project would result in a significant noise impact if it:

- Exposes individuals to, or generates, noise levels in excess of published noise standards
- Results in a substantial temporary increase in ambient noise levels due to construction
- Results in a substantial permanent increase in ambient noise levels due to operations

Potential noise and vibration impacts related to proposed projects in the vicinity of the Federal Center have been analyzed in depth in the following documents:

- *Environmental Assessment, Potential Development of the Western Portion of the Denver Federal Center* (GSA 2005a)
- *Final West Corridor Environmental Impact Statement* (RTD 2003)
- *Noise and Vibration Analysis Technical Report* (KM Chng 2006)

Potential noise- and vibration-generating projects in the vicinity of the Federal Center include the development of St. Anthony Hospital and the construction and operation of the proposed light rail transit project. The *Final West Corridor Environmental Impact Statement* did not evaluate noise and vibration impacts on the Federal Center because no existing sensitive land uses were identified on the Federal Center property. Potential noise and vibration impacts related to the Master Site Plan would likely be similar to, or less than, the impacts described in the above documents. Noise and vibration impacts caused by the implementation of either the Federal Mall or the Federal Quad Alternative would occur primarily during the construction phase. Long-term noise and vibration impacts could be caused by building heating and cooling systems and truck and vehicular traffic on the site and on the surrounding arterials.

4.20.1 Action Alternatives

Heavy equipment use during construction activities would result in a short-term increase in noise levels in the project area. Construction noise typically occurs during the daytime and is intermittent in nature and generally ranges from approximately 75 to 85 dBA at 50 feet. Noise generated from construction activities is dependent on the type of operation and the location of the activities in relation to the receptor. Noise impacts would be greatest on properties closest to the construction activities and this impact would decrease with distance from the construction site. Heavy equipment use during construction would result in increased localized vibration in the immediate project area. Vibrations from construction equipment are typically intermittent, however, and are highly dependent on the type and locations of construction activities. The *Environmental Assessment, Potential Development of the Western Portion of the Denver Federal Center* (GSA 2005a) concluded that vibrations from construction activities would have only short-term negligible to minor adverse impacts. The St. Anthony Hospital project is the only known sensitive receptor in the project area. Based on the distance of the hospital from the nearest planned construction areas, however, construction-related noise impacts that would be generated by implementation of the Master Site Plan is expected to be minor.

The Federal Center is currently impacted by traffic noise on the major arterials including Union Boulevard to the west, 6th Avenue to the north, Alameda Avenue to the south, and

Kipling Street to the east. Each of the proposed action alternatives would increase traffic volumes on these major arterials and at key intersections surrounding the Federal Center. This traffic increase is projected to occur primarily during the morning and afternoon peak hours. The presence of the light rail station and park-n-Ride facility on site would limit some of the traffic increases, however, because a portion of the new employees and residents would likely use bus or light rail to access the Federal Center. The additional traffic volumes would moderately increase traffic noise on the major arterials; however, this increase would not constitute a significant impact. Noise impacts of both the Federal Mall and the Federal Quad aAlternatives would be comparable.

Building heating and cooling systems can also be a source of long-term ambient noise. Impacts from these systems can be mitigated through proper equipment selection and proper installation, screening, and maintenance. Impacts from properly installed and maintained heating and cooling equipment are expected to be negligible.

Cumulative long-term noise impacts associated with the proposed hospital and Flight for Life helicopters were discussed in detail in the *Environmental Assessment, Potential Development of the Western Portion of the Denver Federal Center* (GSA 2005a). It was concluded in this assessment that helicopter operations would result in a long-term minor adverse impact on surrounding properties. Depending on helicopter flight paths and the location of future mixed-use residential areas, this noise impact could increase as development occurs on lands surrounding the hospital. The Federal Quad Alternative would result in a Mixed-Use Core district being located to the northwestern portion of the Federal Center near the planned hospital. Depending on the location of residential areas within this district, hospital-generated noise impacts under this alternative could increase. Under the Federal Mall Alternative, which places the Mixed-Use Core district further from the hospital and from helicopter operations, the noise impacts attributable to the hospital would not increase.

Cumulative long-term noise impacts associated with the operation of the light rail line and park-n-Ride facility were discussed in detail in the *Final West Corridor Environmental Impact Statement* (RTD 2003). No sensitive receptors were identified on the Federal Center site and the highest predicted noise level at any sensitive receptor along the rail alignment was projected to be 66 dBA at a distance of 35 feet from the tracks. The *Final West Corridor Environmental Impact Statement* (RTD 2003) concluded that operation of the light rail transit line and station would not have either moderate or severe impacts on any existing structures on the Federal Center, and therefore noise mitigation was not required. Because the light rail line will travel close to the proposed Mixed-Use Core districts under both the Federal Quad and the Federal Mall aAlternatives, residential structures constructed in these areas may experience some noise related to the operation of the light rail trains. Based on the predicted noise impacts on existing residential structures located elsewhere along the West Corridor alignment, the noise impact on future residences in the Mixed-Use Core districts on the Federal Center property is not expected to be significant.

The *Final West Corridor Environmental Impact Statement* (RTD 2003) did not identify any vibration-sensitive land uses on the Federal Center. Vibration related to transit operations increases with increasing speed of the trains. The EIS concluded that damage to existing buildings related to the operation of the rail line is not likely to be an issue. In addition, based

on an assessment of vibration propagation through the soil, the EIS concluded that residential structures located 72 feet or more away from the edge of the track would not have significant operational vibration impacts even at train speeds of up to 50 mph. Based on the presence of the transit station and curved sections of track on the Federal Center site, operational speeds and potential vibration impact would be lower on the Federal Center than in the existing residential areas located elsewhere along the West Corridor alignment that were evaluated in the EIS. Accordingly, although the transit station would be located near the proposed Mixed-Use Core districts under both action alternatives, the potential for vibration impacts on future residential structures would be low.

4.20.2 No Action Alternative

The No Action Alternative would not have adverse effects due to noise or vibration impacts. Current sources of noise and vibration would continue to occur. Cumulative impacts from other planned projects such as the proposed hospital and RTD development would be as described under the action alternatives.

4.20.3 Mitigation

The following measures could be used to reduce noise and vibration impacts during construction:

- Minimize construction activities within mixed-use areas during evening hours and on weekends.
- Ensure that construction equipment is properly maintained and is equipped with standard noise abatement measures.
- Avoid the use of impact pile driving near noise sensitive areas.
- Install temporary noise barriers as needed to protect sensitive receptors from excessive construction noise.

No mitigation measures are proposed during operation because there is no noise and vibration impact.

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