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Appendix 1: Glossary of Terms

**Above Ground [Utility Infrastructure]**
The placement of utility infrastructure above the surface of the ground.

**Affected Entity**
A public utility, franchise holder, local or regional agency, or any other entity having responsibility for planning or providing public facilities relating to transportation, solid waste, energy generation and transmission, conventions and the promotion of tourism, air quality, or public education. Does not include a state agency or a public utility that is subject to regulation by the public utilities commission of Nevada (NRS 278.026).

**Affordable Housing**
Housing that is affordable for a family with a total gross income equal to or less than 80 percent of the median gross income for the county concerned based upon the estimates of the U.S. Department of Housing and Urban Development (HUD) of the most current median gross family income for the county (NRS 278.0105).

**Agriculture**
The use of land for agricultural purposes, including farming, dairying, pasturage, agriculture, horticulture, floriculture, viticulture, animal and poultry husbandry, and the necessary accessory uses for storing the products.

**Amendment**
Any repeal, modification, or addition to a goal, policy, or procedure, any new goal, policy or procedure, or any change in the number, shape, boundary or area or any repeal or modification of any map, part thereof or addition thereto.

**Annexation**
The process used by a municipality to add surrounding fringe areas to the City or town.

**Annual Reporting**
A means by which local governments and affected entities submit material and data on an annual basis with regards to information contained in the Regional Plan.

**Area Median Income (AMI)**
The Area Median Income is established by the U.S. Department of Housing and Urban Development (HUD) based on a family of four and adjusted for family size. HUD issues a listing of the area median incomes by Metropolitan Statistical Area (MSA) and by county each year. Also known as “median gross family income.”

**Archeological Resources**
Any material of past human life, activities, or habitation that are of historic or prehistoric significance. Such material includes, but is not limited to, pottery, basketry, bottles, weapon projectiles, tools, structures, pit houses, rock paintings, rock carvings, intaglios, graves, skeletal remains, personal items and clothing, household or business refuse, printed matter, manufactured items, or any piece of the foregoing items.
Attainable Housing
Housing that is affordable for a family with a total gross income greater than 80 percent and equal to or less than 120 percent of the median gross income for the county concerned based upon the estimates of the U.S. Department of Housing and Urban Development (HUD) of the most current median gross family income for the county. Also known as “workforce housing.”

Boundary
A line which may or may not follow a visible feature that defines the limits of a geographic entity such as a block, block numbering area, census tract, county, or place.

Bureau of Land Management (BLM)
An agency within the U.S. Department of the Interior which administers 264 million acres of America’s public lands located primarily in 12 Western States. The BLM sustains the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

Bureau of Land Management Cultural Resource Inventory General Guidelines
A document, which acts as a set of guidelines for instructions for conducting cultural resource inventories on BLM lands, or lands affected by BLM actions, within the state of Nevada.

Bus Rapid Transit (BRT)
Fixed-route bus systems that either (1) operate their routes predominantly on fixed-guideways (other than on highway HOV or shoulder lanes, such as for commuter bus service) or (2) that operate routes of high-frequency service with the following elements: Substantial transit stations, traffic signal priority or pre-emption, low-floor vehicles or level-platform boarding, and separate branding of the service. High-frequency service is defined as 10-minute peak and 15-minute off-peak headways for at least 14 hours of service operations per day. This mode may include portions of service that are fixed-guideway and non-fixed-guideway.

Capital Improvements Program (CIP)
A plan for capital expenditures to be incurred each year over a fixed period of several years setting forth each capital project identifying the expected beginning and ending date for each project, the amount to be expended in each year, and the method of financing those expenditures.

Census
A complete enumeration, usually of a population but also businesses and commercial establishments, farms, governments, and so forth.

Civic Uses
Any land, building or facility providing a service or function supported and managed by a City, County, or State Government.

Charter School
A public school that is formed pursuant to the provisions of NRS 388A.

Co-location [of utility infrastructure]
The use of existing utility infrastructure to affix or erect additional utility equipment.
**Community**
A sub-area of the County located within the Truckee Meadows Service Area consisting of residential, institutional, and commercial uses sharing a common identity.

**Compatible**
Any property, use, or service that is capable of direct association with certain other uses because it is complementary, congruent, or otherwise non-detrimental.

**Concurrency**
A land use planning and implementation tool that is designed to ensure that necessary public services and facilities to support new development are or will be available and adequate, based on adopted levels of service (LOS) standards, at the time the impact of new development occurs.

**Consensus Forecast (CF)**
A methodology combining the population/employment forecasts from various reliable sources.

**Contiguous**
Contiguous means either abutting directly on the boundary or separated by a street, alley, public right-of-way, creek, river or the right-of-way of a railroad or other public service corporation.

**Cool Roof**
A roof that has been designed to reflect more sunlight and absorb less heat in comparison to a standard roof.

**Cooperative Planning Area**
Areas within the Truckee Meadows where more than one jurisdiction has an interest in the density, intensity, or character of.

**Cultural Resources**
Those resources that possess qualities of significance in American, Nevada, or Washoe County history, architecture, archaeology, and culture present in districts, sites, structures, and objects that possess integrity of location, design, setting, materials, workmanship, congruency, and association.

**Density**
The result of dividing the total number of dwelling units on a site by the total site area. For purposes of calculating density, the site area shall include passive open space with legal public access, and shall not include any of the following: 1) non-residential, mixed-use and public facility properties; 2) property in the Development Constraints Area; 3) property outside the Truckee Meadows Service Areas; 4) existing golf courses; 5) existing parks; and 6) existing regional street and rail rights-of-way.

**Development**
Any building, construction, renovation, mining, extraction, dredging, filling, excavation, or drilling activity or operation; any material change in the use or appearance of any structure or in the land itself; the division of land into parcels; any change in the intensity or use of land, such as in increase in the number of dwelling units in a structure or a change to a commercial or industrial use from a less intensive use; any activity that alters a shore, beach, seacoast, river, stream, lake, pond, canal, marsh, dune area, woodlands, wetland, endangered species habitat, aquifer or other resource area, including coastal construc-
tion or other activity.

**Development Constraints Area (DCA)**
Area consisting of playa, significant water bodies, jurisdictional water/wetland in accordance with Section 404 of the Clean Water Act, designated FEMA floodway areas within the Zone AE, natural slopes over 30%, publicly owned open space, and properties that are deed restricted to prevent development, but not including constrained lands less than 1/3 acre in size.

**Dwelling**
A building, or part of a building, containing living, sleeping, housekeeping accommodations, and sanitary facilities for occupancy by one or more families.

**Economy**
Management of the resources of a community or business.

**Educational Infrastructure**
Facilities and services which serve to provide educational instruction to students.

**Easement**
A grant by a property owner to the use of land by the public, a corporation, or persons for specific purposes such as the construction of utilities, drainage ways and roadways (Source: American Planning Association).

**Electrical Distribution Line**
A utility line with the capacity to carry less than 60 kilovolts of electricity typically extending from a feeder cable into a specific area for the purpose of providing service to that area.

**Electrical Transmission Line**
A utility line with the capacity to carry 60 kilovolts or more of electricity.

**Environment**
The physical conditions which exist within the area that will be affected by a proposed project, including land, air, water, mineral, flora, fauna, noise, and objects of historic or aesthetic significance.

**Ethnic**
Of or pertaining to a religious, racial, national, or cultural group.

**Expansion [electrical transmission]**
Any increase in the capacity of an existing electrical transmission line or utility corridor.

**Facility Plans**
A plan for the development of public facilities that will have a regional impact or aide in accomplishing regional goals relating to transportation, solid waste, energy generation and transmission, conventions and the promotion of tourism, air quality, or public education. The term does not include a plan for the development of a specific site or regulations adopted by an affected entity to implement the Regional Plan. Also known as “Facilities Plan” (see subsection 2 of NRS 278.026).
Feathering (of densities)
A graduated change in density between areas of higher intensity of use to areas of lower intensity of use. Feathering strategies may include, but are not limited to, a gradual change in lot size, compatible frontage widths for lots facing each other, building designs that create compatibility on facing lots, or landscape buffering.

Federal Energy Regulatory Commission
An independent commission that regulates the transmission of oil and natural gas, the transmission and wholesale sale of electricity, and the licensing of hydroelectric companies.

Federal Emergency Management Agency (FEMA)
An independent agency that provides a single point of accountability for all federal emergency preparedness, mitigation, and response activities.

FEMA Floodplain Zone AE
Areas that have a 1% probability of flooding in any year (also known as the “100-year floodplain”), and where predicted flood water elevations above mean sea level have been established. Properties in Zone AE are considered to be at high risk of flooding under the National Flood Insurance Program (NFIP). Flood insurance is required for all properties in Zone AE that have federally-backed mortgages. Construction in these areas must meet local jurisdiction floodplain ordinance requirements.

Fixed Route Service
Transit service using rubber tired passenger vehicles operating on fixed routes and schedules, regardless of whether a passenger actively requests a vehicle.

Floor-Area Ratio (FAR)
The ratio of the total floor area of buildings on a certain location to the size of the land of that location. As a formula: Floor Area Ratio = (Total covered area on all floors of all buildings on a certain plot)/(Area of the plot). Thus, an FAR of 2.0 would indicate that the total floor area of a building is two times the gross area of the plot on which it is constructed.

Floodway Area
The floodway is defined as: “the channel of a river or stream, and those portions of the floodplain adjoining the channel required to carry the regional flood discharge.” Floodways are generally associated with moving water during a flood event. Under local jurisdiction floodplain ordinances, most construction is prohibited in a floodway.

Forecasts
The most probable of a set of projections to happen.

Freestanding Community
Designated communities in the Rural Area that have been in existence since before the adoption of the Region’s first Regional Plan, and have different characteristics than the rest of the Rural Area.

Gaming Sector
Those activities pertaining to a full range of gaming activities including, for example; race and sports betting, lotteries, casinos, community gaming (eg. “housie”), non-casino gaming machines, Internet and
cross-border gaming.

**Geographic Area**
The area covered by the Regional Plan includes all of Washoe County except the portions within the drainage basin of Lake Tahoe (see Nevada Revised Statutes (NRS) 278.0288) and the lands of federally-recognized tribes. The primary focus of the Truckee Meadows Regional Plan which includes the southern 15% of Washoe County with a northern boundary at T26N.

**Goal**
A desired state of affairs to which planned effort is directed.

**Governing Body**
The City council or other legislative body of the City or the board of County commissioners or, in the case of Carson City, the board of supervisors (NRS 278.015).

**Greenways**
A linear open space of varying width that is part of a bigger network established along a corridor, such as a river or road right-of-way, that is usually developed for non-vehicular public use.

**Growth**
An increase in size, number, value, or strength.

**Housing Products**
The broad range of styles and types of residences or dwelling places for people.

**Human Scale Development**
Development designed to create and sustain a pleasant and efficient environment for pedestrians, through the utilization of such features as ample sidewalks; short walking distances; choices of pedestrian routes; continuity of pedestrian routes; provisions of amenities for pedestrians; restrained scale of lots, blocks, buildings, setbacks, signage, street widths, parking areas and commercial and residential clusters; fine-grained mixed uses; eye-level architectural detail; and, access by multiple transportation modes.

**Implementation**
Actions, procedures, programs, or techniques that carry out policies.

**Incorporated City**
Areas/neighborhoods organized for the purpose of self-government. Reno and Sparks are the only incorporated cities in Washoe County.

**Industrial Development**
A business use or activity at a scale greater than home industry involving manufacturing, fabrication, assembly, warehousing, and/or storage.

**Industry Sector**
A distinct part of division which pertains to the manufacture, fabrication, processing, reduction, or
destruction of any article, substance or commodity, or any treatment thereof in such a manager as to change the form, character, or appearance thereof, and includes storage elevators, truck storage yards, warehousing, wholesale storage, and other similar types of enterprise.

**Infill**
Development or redevelopment of land that has been by-passed, remained vacant, and/or is underused as a result of the continuing urban development process. Generally, the areas and/or sites are not particularly of prime quality; however, they are usually served by or are readily accessible to infrastructure.

**Infrastructure**
Basic facilities including, but not limited to, potable water facilities, reclaimed water facilities, wastewater treatment facilities, flood management facilities, public safety facilities, roads, schools, power plants, transmission lines, transportation, and communication systems on which the continuance and growth of a community depends.

**Intensity**
Any ratio that assesses the relative level of activity of a land use, including, but not limited to, a floor area ratio, building coverage ratio, or impervious surface ratio.

**Jurisdictions**
Any governmental unit or political division or subdivision including, but not limited to city, county, state, district, or territory over which the governmental unit exercises power and authority.

**Kilovolt (kV)**
The equivalent of 1,000 volts (see definition of “volt”).

**Land Use**
The primary or primary and secondary uses of land such as single family residential, multiple-family residential, commercial, industrial or agriculture. The description of a particular land use should convey the dominant character of a geographic area and thereby establish the types of activities which are appropriate and compatible with primary uses.

**Land Stock**
An inventory of the quantity of land available for use.

**Local Government**
The City of Reno, City of Sparks, or Washoe County.

**Local Renewable Energy Source**
Energy generated from, but not limited to, solar, geothermal, hydroelectric, biomass, methane, and waste heat recovery that is intended solely for a single end use on or directly adjacent to the parcel on which the energy is generated. Small amounts of the electricity generated from local renewable energy sources may temporarily return to the power grid in circumstances where net metering arrangements exist.
Lot
A distinct part or parcel of land that has been subdivided to transfer ownership or to build. The term does not include a parcel of land used or intended solely for use as a location for a water well (NRS 278.0165).

Low Impact Development (LID) Practices
Policies, procedures, and general guidance concerning site design techniques for improving the quality and reducing the quantity of storm water runoff from new development and redevelopment.

Master Plan
A comprehensive, long-term, general plan for the physical development of the city, County, or region which includes analysis, recommendation, and proposals for the geographic area it covers.

Military installation
Military installation means a base or facility at which or from which the Air Force, Army, Coast Guard, Marine Corps, Navy, Air Force Reserve, Army Reserve, Coast Guard Reserve, Marine Corps Reserve, Navy Reserve or National Guard conducts exercises, maneuvers, operations, patrols or training.

Minority
A racial, religious, political, national, or other group regarded as different from the larger group of which it is part.

Mixed-Use Development
A single building or land containing more than one type of land use or single development of more than one building and use, where the different types of land uses are in close proximity, planned as a unified complementary whole, and functionally integrated to the use of shared vehicular and pedestrian access and parking areas.

Mixed-Use Core Area
Within the TMSA where the most intense development is expected to occur and is the highest priority for investment. This area is characterized by mixed use areas that are high-density and intensity and will have the highest level and range of activities in the region including shopping, recreation, dining and entertainment, gaming and accommodation, employment and education, cultural or community events, and public services and facilities. Planning for development in this area should focus on a high degree of pedestrian activity and be well-served by public transit.

Multi-family
A detached building designed and used exclusively as a dwelling by three or more families occupying separate suites.

Multi-modal
Any and all forms of transportation including but not limited to walking, bicycling, transit services, automobile, and rail systems.

Municipal Services
Services provided by local government and/or affected entities including, but not limited to, potable water supply, reclaimed water supply, sanitary sewer, roads, parks, schools, and public safety. It is under-
stood that this term includes the infrastructure necessary to provide municipal services.

**National Electric Safety Code (NESC)**
A document published by the Institute of Electrical and Electronics Engineers that sets the ground rules for practical safeguarding of persons during the installation, operation, or maintenance of electric supply and communication lines and associated equipment. The NESC contains the basic provisions that are considered necessary for the safety of employees and the public under the specified conditions (Source: IEEE).

**National Ambient Air Quality Standards**
A set of standards published by the USEPA in Title 40 of the code of Federal Regulations Subpart 50 that define the levels of air quality necessary to protect human health. The standards apply to the following pollutants: Carbon Monoxide, Ozone, Nitrogen Dioxide, Sulfur Dioxide, Particulate Matter, and Lead.

**Natural Resource**
Air quality, quality and quantity of surface water and groundwater; habitat for fish, vegetation, and wildlife; open space; floodplains; wetlands, aquifer recharge areas; stream channels; soils; scenic quality; and energy sources.

**Neighborhood**
An area of a community with characteristics that distinguish it from other community areas that may include schools, social clubs, or boundaries defined by physical barriers, such as major highways and railroads, or natural features, such as rivers.

**Net Metering**
A method of metering the energy produced by local renewable energy sources that allows excess electricity produced by the energy source to be returned to the power grid at a credit to the utility customer. Excess power is often credited at full retail price and is used to offset any electricity purchased from the utility. The metered customer is then billed only for the net energy consumed from the power grid.

**Nevada Department of Transportation (NDOT)**
A governmental agency of Nevada that serves to efficiently plan, design, construct, and maintain a safe and effective transportation system for Nevada’s economic, environmental, social, and intermodal needs.

**Northern Nevada Water Planning Commission (NNWPC)**
Body of Public Works Directors, Water Resource Managers and individuals appointed by the Western Regional Water Planning Commission. This commission’s primary function is to serve as the Technical Advisory Committee to the Western Regional Water Commission and is responsible for developing and maintaining the Regional Water Management Plan.

**Open Space**
Properties with free and legal public access that are generally in a natural state. Open space may include spaces that are inappropriate for access or development for any reason such as sensitive environments or hazardous areas (e.g., landslide areas). Open spaces provide native plant and wildlife habitat, passive recreational opportunities, enhance the scenic character of the region, and allow for preservation of significant cultural and archaeological resources.
Optimization
The process of making a system as effective or as functional as possible.

Pedestrian Access and Amenities
Include, but are not limited to, adequate sidewalks (width and connectivity), plazas, frequent crosswalks, on-demand crosswalk signals, wheelchair accessibility, covered shelters, publicly accessible restrooms, public art, benches, public telephones, landscaping, trash facilities, and public spaces such as small parks.

Pedestrian Friendly
Pedestrian friendly features are designed to promote increased walking, street life, and transit ridership. Pedestrian friendly features such as wide, continuous sidewalks, bulb-outs at intersections, shorter crossing distance and signal cycles, mid-block crosswalks, tight radii curb returns, and closely spaced transit access encourage pedestrian use and enhance transit ridership.

Plan
A document, adopted by an agency, that contains, in text, maps, and/or graphics, a method of proceeding, based on analysis and the application of foresight, to guide, direct, or constrain subsequent actions, in order to achieve goals. A plan may contain goals, policies, guidelines, and standards.

Planned Unit Development (PUD)
A type of building development and also a regulatory process. As a building development, it is a designed grouping of both varied and compatible land uses, such as housing, recreation, commercial centers, and industrial parks, all within one contained development or subdivision.

Playa
Generally a dry or intermittently dry lakebed in the lowest spot of a closed valley. Salt contents are generally quite high.

Point Source
Any discernible, confined and discrete conveyance, including but not limited to a pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. The term does not include return flows from irrigated agriculture (NRS 445A.395).

Policy
A specific statement of principle or of guiding actions that implies clear commitment. A general direction that a governmental agency sets to follow in order to meet its goals and objectives.

Power Generation Capacity
The maximum amount of electricity (usually measured in watts) capable of being produced at a given power generation facility.

Power Generation Facilities
Any facility owned and operated by a public or private utility company or independent power producer for the purpose of generating electric power for distribution through the local electric distribution network or for sale to electric transmission companies.
Preservation
To keep in perfect or unaltered condition; maintain unchanged.

Private School
A school that is owned or operated by a private person, firm, association, organization, or corporation, rather than by a public agency.

Projections
A statement about the future based upon the past.

Promote
To contribute to the progress of, or growth of; further.

Public Access
A means of physical approach to, along, and into lands available to the general public.

Public Facilities
A use conducted by, or a facility or structure owned or managed by, a publicly funded entity that provides a governmental function, activity, or service for public benefit.

Public Lands
Any land area owned and managed by a public entity for the public good.

Public School
All kindergartens and elementary schools, junior high schools and middle schools, high schools, charter schools and any other schools, classes and educational programs which receive their support through public taxation and, except for charter schools, whose textbooks and courses of study are under the control of the State Board.

Public Transportation/Transit
Transportation by a conveyance that provides regular and continuing general or special transportation to the public, but does not include school bus, charter, or intercity bus transportation or intercity passenger rail transportation.

Public Utilities Commission of Nevada (PUCN)
Pursuant to NRS Chapter 703, the PUCN is a body of three commissioners each appointed by the governor with the power and duty to supervise and regulate the operation and maintenance of public utilities in the state.

Recommendations
Preferred courses of action which assist in the achievement of goals. Recommendations are planning, land use, and general government-related activities that can be pursued, ideally as a whole, to help the community meet its goals and thresholds.

Region
See: “Geographic Area.”
Regional Land Designation
A tool to further refine the Region’s form and includes the following designations: Mixed Use Core, Tier 1 Land, Tier 2 Land, Tier 3 Land, and Rural Area.

Regional Planning Commission (RPC)
The RPC has nine members, including three each from the Reno, Sparks, and Washoe County local planning commissions, appointed by their respective governing bodies (NRS 278.0262).

Regional Planning Governing Board (RPGB)
The RPGB consists of ten members including three from the Washoe County Commission, four from the Reno City Council, and three from the Sparks City Council (NRS 278.0264).

Regional Renewable Energy Source
Energy generated from, but not limited to, solar, geothermal, hydroelectric, biomass, methane, and waste heat recovery sources that generate enough power such that the electricity generated is purchased by a utility provider for region-wide use. This does not apply to local renewable energy sources that produce electricity for immediate on-site use.

Regional Transportation Commission (RTC)
The Regional Transportation Commission is the designated Metropolitan Planning Organization for Washoe County and is responsible under the Transportation Equity Act for the 21st Century for developing the Regional Transportation Plan.

Regional Transportation Plan (RTP)
The RTP serves as the region’s long-range transportation plan to accommodate the Regional Form and land-use, master-planned development in the City of Reno, the City of Sparks, and Washoe County.

Regional Utility Corridor
A planning designation assigned to a utility easement that contains or is proposed to contain one or more electrical transmission lines. The width of a regional utility corridor shall be equivalent to the width of the easement required by the responsible utility. The width of the easement may not be less than that specified by the NESC.

Regional Utility Corridor Setback
The minimum distance by which any structure must be set back from the edge of a regional utility corridor.

Regional Water Management Plan (RWMP)
Document which provides the region with an outline of how water will be managed to meet the needs of the citizens into the future. Major components of the plan are identification of future water supply and wastewater facilities, regional flood control and drainage projects, and development of a conservation program. Serves the area generally described as all lands within Washoe County south of T25N, excluding the Lake Tahoe watershed, Pyramid Lake Paiute Indian Reservation, and other tribal trust lands within the planning areas.

Regulation
A rule or order prescribed for management by government.
Renewable Energy
Energy generated from rapidly renewable or inexhaustible sources including, but not limited to, solar, geothermal, hydroelectric, biomass, methane, and waste heat recovery sources.

Reno Redevelopment Agency
Created in 1983 and serves as the economic development arm of the City of Reno. The Redevelopment Agency has the power to: buy private property for resale; reallocate property and sales tax increment in order to finance the redevelopment program of the community; and use other incentives to foster redevelopment of blighted properties.

Reno-Sparks Convention and Visitors Authority (RSCVA)
Established in 1959 as the Washoe County Fair and Recreation Board. The RSCVA acts as a marketing organization for the county to promote convention and tourism business.

Reno-Tahoe Airport Authority (RTAA)
The Reno-Tahoe Airport Authority is the owner and operator of the Reno-Tahoe International and Reno-Stead Airports. It is governed by a nine member Board of Trustees, operates as a business, and receives no local tax dollars.

Resort Destination
A resort facility or development of multiple buildings intended primarily for transient guests where the primary attraction is generally recreational facilities or activities, including, but not limited to snow sports and activities (i.e., ski area residential uses shall be primarily “ski-in / ski-out”), golf, dude and guest ranches, health spas and resorts, backcountry adventures, hunting, fishing, and water sports. A resort destination is generally located in a setting of significant natural amenities, and may include a range of on-site indoor or outdoor recreation facilities.

Resort Service Area (RSA)
An area in the Rural Area, where local government master plans may allow for the development of resort destinations.

Right-of-way
A strip of land acquired by reservation, dedication, prescription, or condemnation intended to be occupied by a street, trail, water line, sanitary sewer, and/or other public utilities or facilities.

Road
All property dedicated or intended for public or private road, street, alley, highway, freeway, or roadway purposes, or dedicated or intended for public easements therefore.

Rural Area (RA)
All of the land subject to TMRPA jurisdiction that is outside of the TMSA. This area is restricted to very low density development, and generally consists of dispersed development and employment on large parcels of land. Parcels may not be less than five acres in size unless designated as a Freestanding Community or Rural Development Area.

Rural Development Area (RDA)
Designated areas within the Rural Area which aim to preserve open space and natural resources by al-
allowing for parcels of less than five acres to be created, in return for designated open space. The overall density of these areas may not exceed an overall density of one dwelling unit per five acres.

**School**
A school is defined as being either a primary, secondary, or non-traditional secondary (public or private) institution of learning which offers instruction in one or more branches of learning.

**Shall**
Mandatory to carry out the policy, even if a timeframe is not included. Meaning imperative and non-discretionary. Subject to funding and budgetary constraints, which may not allow for implementation of the policy and subject to provisions of the annual budget.

**Significant Ridgelines**
Ridgelines that surround or visually dominate the valley landscape either through their size in relation to the hillside or mountain terrain of which they are a part; their visual dominance as characterized by a silhouetting appearance against the sky; as a significant backdrop feature or separation of communities; through visual dominance due to proximity and view from existing development or major corridors; or as an area of significant ecological, historical or cultural importance such as those which connect park or trail systems.

**Sparks Redevelopment Agency**
The Redevelopment Agency for the City of Sparks which has the power to: buy private property for resale; reallocate property and sales tax increment in order to finance the redevelopment program of the community; and use other incentives to foster redevelopment of blighted properties.

**Sphere of Influence (SOI)**
An area into which a City plans to expand as designated in a comprehensive Regional Plan adopted pursuant to NRS 278.026 to 278.029, inclusive, within the time designated in the comprehensive Regional Plan (NRS 268.623).

**Sprawl**
Premature growth or outward expansion of development. Low-density land-use patterns that are automobile-dependent, energy and land consumptive, and require a very high ratio of road surface to development served.

**Stakeholder**
Individuals and/or groups which have a shared interest in an enterprise.

**Streets**
Open and public thoroughfares including streets, avenues, boulevards, roads, lanes, alleys, viaducts, public easements and right-of-way, and other ways (NRS 278.018).

**Substation [Electrical]**
An assemblage of equipment that switches, changes, or regulates voltage in the electric transmission and distribution system. Substations that connect two or more transmission circuits without transforming the voltage are called switching stations or taps (see also “utility site”).
Substation [Natural Gas]
An assemblage of equipment for the use of managing the supply of natural gas in the regional system (see also “utility site”).

Sustainability
Community use of natural resources in a way that does not jeopardize the ability of future generations to live and prosper.

Sustainable design and construction
Design and construction techniques that maintain or enhance economic opportunity and community well-being while protecting and restoring the natural environment upon which people and economies depend. Sustainable design and construction meet the needs of the present without compromising the ability of future generations to meet their own needs.

Tier 1 Land
Area within the TMSA where moderate/varying range development is expected and number two in the priority hierarchy for development. A variety of residential and non-residential uses exist in this area.

Tier 2 Land
Area within the TMSA where there is generally less dense development occurring at suburban levels, with some higher density nodes, and third in the priority hierarchy for development.

Tier 3 Land
Area that is generally on the periphery of the TMSA and contains low density development, is undeveloped, or contains significant development constraints.

Tentative Map
A map made to show the design of a proposed subdivision and the existing conditions in and around it (NRS 278.019).

Transit Oriented Development (TOD)
Moderate and high-density housing concentrated in mixed-use developments located along transit routes that support the provision of higher order transit service such as bus rapid transit. The location, design, and mix of uses in a TOD emphasize pedestrian-oriented environments and encourages the use of public transportation.

Transmission Capacity
The maximum voltage able to be carried in a given electrical transmission line.

Truckee Meadows Regional Plan
A comprehensive Regional Plan for the physical development and orderly management of the growth of the region for the next 20 years.

Truckee Meadows Service Area (TMSA)
Areas within which municipal services and infrastructure will be provided. This area includes the high-intensity Mixed Use Core, Tier 1 Lands, Tier 2 Lands, and Tier 3 Lands where regional growth is prioritized.
**Underground Construction (Undergrounding)**
The placement of utility infrastructure below the surface of the ground.

**Unincorporated Areas**
Areas outside any city and under Washoe County’s jurisdiction.

**Urban Cool Island**
Built areas that have mitigated the negative urban heat island effects.

**Urban Heat Island**
Built areas that are significantly warmer than nearby rural areas due to human activity.

**Utilities**
All lines and facilities related to the provision, distribution, collection, transmission, or disposal of water, storm and sanitary sewage, oil, gas, power, information, telecommunication and telephone cable.

**Utility Corridor**
See: “Regional Utility Corridor.”

**Utility Provider**
Any public or private entity including a governmental utility, a public utility regulated by the PUCN, a rural electric cooperative, a cooperative association, nonprofit corporation, nonprofit association or provider of electric service, or a community water system that provides water service, electric service or natural gas service to 500 or more service locations; or operates any pipeline that is necessary to provide such service (NRS 239C.110).

**Utility Site**
An electrical or natural gas substation.

**Viewshed**
The area within view from a defined observation point.

**Volt**
A unit of measurement of force, or pressure, in an electrical circuit.

**Washoe County Health District (WCHD)**
Established through Nevada Revised Statute (NRS 439.370 et seqq) and the 1986 Interlocal Agreement (last amended 1993), and has jurisdiction over all public health matters in Reno, Sparks, and Washoe County through the policy-making Washoe County District Board of Health.

**Washoe County School District (WCSD)**
The public school district providing public education to students in Washoe County, Nevada, including the cities of Reno and Sparks, and the unincorporated communities of Verdi, Incline Village, and Gerlach.

**Waste Management**
Provider of comprehensive waste management for residents of Washoe County, providing services that
range from collection and disposal to recycling and renewable energy generation.

Water Bodies
Areas that include lakes, playas, rivers, streams, and federally designated wetlands and floodways.

Watershed
All lands enclosed by a continuous hydrologic drainage divide and lying upslope from a specified point on a stream. Also referred to as water basin. A ridge of relatively high land dividing two areas that are drained by different river systems.

Western Regional Water Commission (WRWC)
Board of elected officials from each of the local jurisdictions and publicly owned water purveyors set up by Senate Bill 487, which was passed in the 2007 Legislative Session. This Board’s main focus will be to improve water resource planning at the regional level, facilitate coordinated resource management among all water purveyors and adopt or revise the Regional Water Management Plan as needed.

Wetland
Those areas that are inundated and saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, including swamps, marches, bogs, and similar areas. Specifically, jurisdictional water/wetland in accordance with Section 404 of the Clean Water Act.

Workforce Housing
Housing that is affordable for a family with a total gross income greater than 80 percent and equal to or less than 120 percent of the median gross income for the county concerned based upon the estimates of the US Department of Housing and Urban Development (HUD) of the most current median gross family income for the county. (NRS 278.0105) Also known as “attainable housing.”

Zone
Any section or sections of a City or County for which the regulations governing the use of land and the use, density, bulk, height, and coverage of buildings and other structures, are uniform.

Zoning
A local ordinance that divides a community into districts and specifies allowable uses and development standards for each consistent with the adopted community master plan.
Appendix 2: PRS Guidelines (RPC Resolution 13-06)

RESOLUTION NO. 13-06 (RPC)
A RESOLUTION ADOPTING GUIDELINES FOR THE DEFINITION OF PROJECTS OF REGIONAL SIGNIFICANCE

WHEREAS, Subsection 1 of NRS 278.0278 requires that before a project of regional significance is approved finally by the county or city and before construction on a project of regional significance may begin, the regional planning commission must make a finding that the project is in conformance with the adopted regional plan; and

WHEREAS, NRS 278.0277 provides for the adoption of guidelines for the review of whether a proposal for the use of land is a project of regional significance; and

WHEREAS, NRS 278.026 contains a definition of “project of regional significance” which makes reference to the guidelines of the regional planning commission; and

WHEREAS, on May 5, 1993, the Regional Planning Commission adopted Resolution 93-2, which established guidelines for determination of whether a proposal constituted a project of regional significance; and

WHEREAS, on May 12, 2004, the Regional Planning Commission adopted Resolution 04-04, which amended and replaced Resolution 93-2 establishing the guidelines for determination of whether a proposal constituted a project of regional significance; and

WHEREAS, on January 11, 2006, the Regional Planning Commission adopted Resolution 06-01, which amended and replaced all previous resolutions establishing the guidelines for determination of whether a proposal constituted a project of regional significance; and

WHEREAS, during the 2009 regular session of the Nevada Legislature, Assembly Bill 289 was adopted amending Nevada Revised Statutes 278.026, subsection 5(a), requiring the Regional Planning Commission to include consideration of the loss or significant degradation of a designated paleontological resource in the Regional Planning Commission’s guidelines governing projects of regional significance; and

WHEREAS, on September 9, 2009, the Regional Planning Commission adopted Resolution 09-16, which amended and replaced all previous resolutions establishing the guidelines for determination of whether a proposal constituted a project of regional significance, and
WHEREAS, on July 10, 2013, the Regional Planning Commission adopted Resolution 13-06, which amended and replaced all previous resolutions establishing the guidelines for determination of whether a proposal constituted a project of regional significance.

NOW, THEREFORE, BE IT RESOLVED that officials of Reno, Sparks and Washoe County shall use the following guidelines to determine if a proposal for the use of land is a project of regional significance:

1. The following guidelines apply to projects which are proposed by anyone other than a public utility:

   A. The project will require a change in zoning, a special use permit, an amendment to a master plan, a tentative map or other approval for the use of land which, if approved, will have an effect on the region of increasing:
      i. Employment by not less than 938 employees;
      ii. Housing by not less than 625 units;
      iii. Hotel accommodations by not less than 625 rooms;
      iv. Sewage by not less than an average of 187,500 gallons per day;
      v. Water usage by not less than 625 acre feet per year;
      vi. Traffic by not less than an average of 6,250 trips daily; or
      vii. Student population (K-12) by not less than 325 students.

   B. The project will require a change in zoning, a special use permit, an amendment to a master plan, a tentative map or other approval for the use of land which, if approved, will allow for a geothermal well field gathering system and power generation facility or a mining operation on any land within 20 miles of the Truckee Meadows Service Areas, the adopted Regional Plan.

   C. The project is located within the 100-year flood zone and will require a change in zoning, a special use permit, an amendment to a master plan, a tentative map or other approval for the use of land which, if approved, will allow for:
      i. the alteration of the stream channel or banks of a portion of the Truckee River or any of its tributaries as identified in the adopted Regional Water Management Plan, or
      ii. the alteration of any wetlands delineated through the Section 404 permit process.

   D. The project will require a change in zoning, a special use permit, an amendment to a master plan, a tentative map or other approval for the use of land which, if approved, will allow for a new or significantly expanded landfill or other land disposal facility subject to regulation under Section 090 of the Washoe County District Board of Health regulations governing solid waste management; or any facility involved with the treatment and/or permanent disposal of hazardous or infectious wastes.
master plan, a tentative map or other approval for the use of land which, if approved, will result in the loss or significant degradation of a designated paleontological site as identified in the adopted local government master plans, if such sites have been designated.

2. The following guidelines apply to a project that is proposed by any entity or person:
   A. An electric substation;
   B. A transmission line that carries 60 kilovolts or more;
   C. A facility that generates electricity greater than 5 megawatts;
   D. Natural gas storage and peak shaving facilities;
   E. Gas regulator stations and mains that operate over 100 pounds per square inch;

3. For purposes of this resolution, the following definitions apply:
   A. “Hazardous waste” means any wastes which meet the criteria contained in NRS 459.430.
   B. “Infectious waste” means any waste meeting the definition in Section 010.2856 of the Washoe County District Board of Health regulations governing solid waste management.
   C. “Mining operation” means the process and facilities involved in the extraction of metallic ores from the earth and specifically excludes non-metallic materials, such as sand, gravel, cinders, diatomaceous earth, slate, shale, gypsum, clay or crushed stone.
   D. “Proposal for the use of land” and “approval for the use of land” include any use of land which requires the issuance of a building permit.
   E. “Public utility” has the meaning ascribed to it in NRS 704.020 and 704.030.
   F. “Traffic” means the average daily trips generated by a project on the peak day.
   G. “Water usage” does not include reuse of treated effluent for irrigation purposes.

4. Applicability:
   A. For a proposed project that involves the redevelopment or adaptive reuse of a developed property, the thresholds contained in Section 1-A of these guidelines apply only to the incremental increase resulting from the project.
   B. For a proposed project that includes the conversion of existing hotel rooms into residential dwelling units, the threshold for housing units contained in Section 1-A(i) of these guidelines applies only to any increase in housing units over and above the existing number of hotel rooms.
   C. A project that the RPC has found in conformance with the Regional Plan and that is subsequently proposed to be amended is considered to fall within the definition of a project of regional significance and therefore becomes subject to conformance review if:
      i. With the proposed amendment, the project will exceed any of the thresholds contained in Section A of these guidelines that by the original project did not exceed; or
ii. The proposed amendment will increase the impact of the overall project by ten percent or more for any of the thresholds contained in Section A of these guidelines that qualified the original project as a project of regional significance.

D. The determination as to whether or not a project meets any one of the criteria listed above shall be based on the total size of the proposed use of land, including all phases, additions, and expansions.

BE IT FURTHER RESOLVED, that these guidelines replace all previous resolutions on this subject and take effect immediately upon adoption of this resolution.

Adopted this day July 10, 2013, by an affirmative vote of the Regional Planning Commission: Aye: 7; Nay: ; Abstain: .

Approved by: Attest:

[Signature]
Chair
Regional Planning Commission

[Signature]
Kimberly H. Robinson
Executive Director of Regional Planning
Appendix 3: Schedule of Amendments

Schedule of Amendments to the 2019 Truckee Meadows Regional Plan
The following amendments have been made since the 2019 Regional Plan was adopted on: October 10, 2019.

<table>
<thead>
<tr>
<th>Amendment Adoption Date</th>
<th>Version Number</th>
<th>Types of Changes Made</th>
<th>Affected Section(s) of the Plan</th>
</tr>
</thead>
</table>

Appendix 4: 2018 Washoe County Consensus Forecast

Washoe County Consensus Forecast

2018 - 2038

September 2018
Acknowledgments

Regional Planning Governing Board

Marsha Berkbigler, Chair (Washoe County Commission)
Donald Abbot – Vice-Chair (Sparks City Council)
Jenny Brekhus (Reno City Council)
Vaughn Hartung (Washoe County Commission)
Naomi Duerr (Reno City Council)
Paul McKenzie (Reno City Council)
Ed Lawson (Sparks City Council)
David Bobzien, (Reno City Council)
Jeanne Herman (Washoe County Commission)
Charlene Bybee, Chair (Sparks City Council)
Veronica Frenkel, Liaison (Washoe County School District Board of Trustees)

Regional Planning Commission

Peter Gower, Chair (Reno)
Sarah Chvilicek, Vice-Chair (Washoe County)
Dian VanderWell (Sparks)
James Fewins (Sparks)
James Barnes (Washoe County)
Ed Hawkins (Reno)
Kevin Weiske (Reno)
Larry Chesney (Washoe County)
Frank Peterson (Sparks)
Truckee Meadows Regional Planning Project Staff
Kimberly H. Robinson, Executive Director
Jeremy M. Smith, GIS Coordinator
Damien Kerwin, GIS/Planning Analyst
Lauren Knox, Regional Planner
Chris Tolley, Regional Planner

Participating Agencies/Commissions
Truckee Meadows Regional Planning Agency
City of Reno
City of Sparks
Northern Nevada Water Planning Commission
Regional Transportation Commission of Washoe County
Truckee Meadows Water Authority
Washoe County
Washoe County School District
Western Regional Water Commission
Sun Valley General Improvement District

Thanks To
Chad Giesinger, AICP, Senior Planner, Washoe County
Bill Thomas, Assistant City Manager, City of Reno
Armando Ornelas, Assistant Community Services Director, City of Sparks
Jim Rundle, Planning Manager, City of Sparks
Jim Smitherman, Northern Nevada Water Planning Commission
Aric Jensen, AICP, Revitalization Manager, City of Reno
Mojra Hauenstein, AICP, Director of Planning and Building, CSD, Washoe County
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Introduction

The Consensus Forecast for Washoe County uses a number of leading forecasts, which has several advantages over using a single source for forecasting population. Not only does the consensus approach minimize the risk of large forecast errors, but consensus forecasts consistently outperform individual forecasts across a range of variables. The consensus approach is discussed in further detail in the article titled “Consensus Forecasts in Planning,” found in Appendix A.

Four reputable sources of long-term forecasts for Washoe County were used: IHS Global Insight, a national forecasting firm in Massachusetts that prepares national, state and county forecasts; Woods and Poole, a national forecasting firm in Washington, DC, that forecasts for every county in the United States, as well as state and national forecasts; Truckee Meadows Water Authority’s Population and Employment Econometric Model; and the 2017 Nevada State Demographer’s Forecast.

The Washoe County Consensus Forecast 2018-2038, uses these sources and outlines the projected population, employment and income for Washoe County through the year 2038. The forecasts in this document are for all of Washoe County including both the cities of Reno and Sparks and the unincorporated areas of Washoe County, including Incline Village. A summary of the consensus forecast for Washoe County is shown in Table 1.

Table 1
Washoe County Consensus Forecast Summary

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Population</th>
<th>Total Employment</th>
<th>Total Personal Income (2009 $)*</th>
<th>Per Capita Income (2009 $)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>464,523</td>
<td>304,135</td>
<td>$21,794,157,000</td>
<td>$46,604</td>
</tr>
<tr>
<td>2023</td>
<td>494,583</td>
<td>331,293</td>
<td>$25,247,316,500</td>
<td>$50,958</td>
</tr>
<tr>
<td>2028</td>
<td>518,562</td>
<td>346,864</td>
<td>$28,363,464,500</td>
<td>$54,333</td>
</tr>
<tr>
<td>2033</td>
<td>539,522</td>
<td>365,252</td>
<td>$31,807,072,500</td>
<td>$57,831</td>
</tr>
<tr>
<td>2038</td>
<td>558,746</td>
<td>384,713</td>
<td>$35,562,973,500</td>
<td>$61,526</td>
</tr>
</tbody>
</table>

*Note: Total Personal Income is reported in 2009 dollars to control for inflation and allow comparison across the 20-year planning timeframe.
The population forecasts prepared by Global Insight, Truckee Meadows Water Authority, Woods and Poole, and the 2017 Nevada State Demographer’s Forecast were compared for consistency and then averaged to arrive at a consensus number. When comparable numbers were not available from each of the four sources, only the numbers that were comparable were averaged. It is noted when less than four sources are used. Only Woods and Poole and Global Insight provided data for Total Establishment-Based Employment, Total Personal Income, and Per Capita Income.

### Table 2

The 2017 Nevada State Demographer’s Forecast of Washoe County Population

(2018 – 2038)

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>458,707</td>
</tr>
<tr>
<td>2019</td>
<td>467,846</td>
</tr>
<tr>
<td>2020</td>
<td>475,845</td>
</tr>
<tr>
<td>2021</td>
<td>483,094</td>
</tr>
<tr>
<td>2022</td>
<td>489,576</td>
</tr>
<tr>
<td>2023</td>
<td>495,630</td>
</tr>
<tr>
<td>2024</td>
<td>501,243</td>
</tr>
<tr>
<td>2025</td>
<td>505,849</td>
</tr>
<tr>
<td>2026</td>
<td>509,680</td>
</tr>
<tr>
<td>2027</td>
<td>512,838</td>
</tr>
<tr>
<td>2028</td>
<td>515,450</td>
</tr>
<tr>
<td>2029</td>
<td>517,676</td>
</tr>
<tr>
<td>2030</td>
<td>519,559</td>
</tr>
<tr>
<td>2031</td>
<td>521,226</td>
</tr>
<tr>
<td>2032</td>
<td>522,682</td>
</tr>
<tr>
<td>2033</td>
<td>523,943</td>
</tr>
<tr>
<td>Year</td>
<td>Forecast</td>
</tr>
<tr>
<td>------</td>
<td>-----------</td>
</tr>
<tr>
<td>2034</td>
<td>525,093</td>
</tr>
<tr>
<td>2035</td>
<td>526,090</td>
</tr>
<tr>
<td>2036</td>
<td>526,949</td>
</tr>
<tr>
<td>2037*</td>
<td>527,808</td>
</tr>
<tr>
<td>2038*</td>
<td>528,667</td>
</tr>
</tbody>
</table>

Source: Nevada State Demographer.

*Note: The Nevada State Demographer’s Forecast is only projected to the year 2036. Therefore, to match the forecast horizon of the other sources, the last two years of the forecast depicted above were extrapolated. The number of new persons added for each year, 2037 and 2038, was calculated using a growth rate of 0.16%. This rate is based on the growth reported in the last year of the demographer’s forecast and was applied to this existing forecast in order to extend the population figures from 2036 through 2038.
Population

Total population in Washoe County is projected to grow from 464,523 in 2018 to 558,746 in 2038. This represents an average annual growth rate of 0.93 percent. The highest forecasted population for 2038 was 598,003 from Woods and Poole, and the lowest forecasted population was 528,667 from the NV State Demographer. The 2018 and 2038 forecasted population by each source is shown in Table 3. The consensus population forecast for each year is shown in Table 4.

Table 3

<table>
<thead>
<tr>
<th>Forecast Source</th>
<th>2018 Forecast Population</th>
<th>2038 Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>IHS - Global Insight</td>
<td>474,006</td>
<td>564,409</td>
</tr>
<tr>
<td>Truckee Meadows Water Authority (TMWA)</td>
<td>460,434</td>
<td>543,906</td>
</tr>
<tr>
<td>Woods and Poole</td>
<td>464,946</td>
<td>598,003</td>
</tr>
<tr>
<td>2017 State Demographer’s Forecast</td>
<td>458,707</td>
<td>528,667*</td>
</tr>
<tr>
<td>Consensus Forecast (Four Sources)</td>
<td>464,523</td>
<td>558,746</td>
</tr>
</tbody>
</table>

Source: Global Insight, Woods and Poole, 2017 State Demographer’s Forecast, and TMWA.

*Note: The Nevada State Demographer Forecast is only projected to the year 2036. Therefore, to match the forecast horizon of the other sources, the last two years of this forecast were extrapolated.
<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>464,523</td>
</tr>
<tr>
<td>2019</td>
<td>471,436</td>
</tr>
<tr>
<td>2020</td>
<td>477,687</td>
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<tr>
<td>2021</td>
<td>483,655</td>
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<td>2022</td>
<td>489,191</td>
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<td>2023</td>
<td>494,583</td>
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<td>2024</td>
<td>499,755</td>
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<td>504,735</td>
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<td>2026</td>
<td>509,475</td>
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<td>2027</td>
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<td>547,364</td>
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<td>2036</td>
<td>551,205</td>
</tr>
<tr>
<td>2037</td>
<td>555,009</td>
</tr>
<tr>
<td>2038</td>
<td>558,746</td>
</tr>
</tbody>
</table>

Source: Global Insight, Woods and Poole, TMWA, and 2017 State Demographer’s Forecast.
The age distribution of the population is expected to shift over the next two decades, primarily in the working and retired age groups (Table 5). Changes of note include the continued aging of the baby boomer population, a decrease in the working group (ages 20-64) and a marked increase in the retired group (ages 65 and older). The percentage of population in the preschool (ages under 5) and school (ages 5-19) groups will remain relatively flat with only slight declines of around 0.2% for each age group. Population by cohort data is available from Global Insight and Woods and Poole. Averaged population by 5-year Age Cohort for 2018 - 2038 is shown in Table 6 on pages 8-9.
### Table 5
Population and Percent Composition of Total Population by Generalized Age Groups

<table>
<thead>
<tr>
<th>Generalized Age Group</th>
<th>2018</th>
<th></th>
<th>2038</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Population</td>
<td>Percent of Total</td>
<td>Population</td>
<td>Percent of Total</td>
</tr>
<tr>
<td>Preschool (Ages 0-4)</td>
<td>29,463</td>
<td>6.3%</td>
<td>35,422</td>
<td>6.1%</td>
</tr>
<tr>
<td>School (Ages 5-19)</td>
<td>85,890</td>
<td>18.5%</td>
<td>106,325</td>
<td>18.3%</td>
</tr>
<tr>
<td>Working (Ages 20-64)</td>
<td>271,840</td>
<td>58.6%</td>
<td>321,904</td>
<td>55.4%</td>
</tr>
<tr>
<td>Retired (Ages 65 and older)</td>
<td>77,025</td>
<td>16.6%</td>
<td>117,555</td>
<td>20.2%</td>
</tr>
<tr>
<td>Totals*</td>
<td>464,217</td>
<td>100%</td>
<td>581,206</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Global Insight, and Woods and Poole.

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<table>
<thead>
<tr>
<th>Age</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
<th>2026</th>
<th>2027</th>
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<tbody>
<tr>
<td>0-4</td>
<td>29,463</td>
<td>30,149</td>
<td>30,696</td>
<td>31,113</td>
<td>31,468</td>
<td>31,817</td>
<td>32,138</td>
<td>32,456</td>
<td>32,752</td>
<td>33,064</td>
</tr>
<tr>
<td>5-9</td>
<td>27,727</td>
<td>27,973</td>
<td>28,353</td>
<td>28,976</td>
<td>29,635</td>
<td>30,299</td>
<td>30,832</td>
<td>31,288</td>
<td>31,620</td>
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<td>33,776</td>
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<td>32,776</td>
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<td>34,866</td>
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<td>36,581</td>
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<td>21,806</td>
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<td>22,301</td>
<td>22,449</td>
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<td>15,839</td>
<td>16,273</td>
<td>16,372</td>
<td>16,673</td>
<td>16,981</td>
<td>17,285</td>
<td>17,599</td>
<td>17,740</td>
</tr>
<tr>
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<td>11,510</td>
<td>11,989</td>
<td>12,442</td>
<td>13,221</td>
<td>13,898</td>
<td>14,549</td>
<td>15,177</td>
<td>15,788</td>
<td>18,817</td>
</tr>
<tr>
<td>Total</td>
<td>516,007</td>
<td>521,575</td>
<td>527,260</td>
<td>532,963</td>
<td>538,625</td>
<td>544,310</td>
<td>550,014</td>
<td>555,746</td>
<td>561,514</td>
<td>575,526</td>
</tr>
</tbody>
</table>

Source: Global Insight and Woods and Poole.
Employment

According to the Woods and Poole forecast and the calibrated Global Insight forecast (see Appendix F for information about calibration), total employment for all of Washoe County is projected to grow from 304,135 in 2018 to 384,713 in 2038. This represents an average annual growth rate of ca. 1.18 percent and overall addition of ca. 80,578 jobs.

The 2018 and 2038 forecasted employment and percent of total employment by industry group is shown below in Table 7. To allow for consistency within employment sectors, only employment data from the Woods and Poole forecast is used in this table as the methodologies of Woods and Poole and Global Insight use different employment assumptions to generate industry sector data.

Table 7
Employment and Percent Composition of Total

<table>
<thead>
<tr>
<th>Employment by Industry Group</th>
<th>2018</th>
<th>2038</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Jobs</td>
<td>Percent of Total</td>
</tr>
<tr>
<td>Natural Resources</td>
<td>2,276</td>
<td>.79%</td>
</tr>
<tr>
<td>Construction</td>
<td>17,703</td>
<td>5.92%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>14,193</td>
<td>4.92%</td>
</tr>
<tr>
<td>Transportation, Communication and Public Utilities</td>
<td>17,438</td>
<td>6.05%</td>
</tr>
<tr>
<td>Wholesale Trade</td>
<td>11,254</td>
<td>3.90%</td>
</tr>
<tr>
<td>Retail Trade</td>
<td>30,135</td>
<td>10.45%</td>
</tr>
<tr>
<td>Finance, Insurance, &amp; Real Estate</td>
<td>35,940</td>
<td>12.46%</td>
</tr>
<tr>
<td>Services</td>
<td>128,648</td>
<td>44.61%</td>
</tr>
<tr>
<td>Government</td>
<td>31,420</td>
<td>10.90%</td>
</tr>
<tr>
<td>Totals</td>
<td>288,377</td>
<td>100%</td>
</tr>
</tbody>
</table>
Industry sectors outlook remains remarkably stable from 2018 to 2038. This is evident in that the largest shift for any sector is only 1.02% of total employment. The largest growth (as a percentage of total employment) can be seen in the Finance, Insurance and Real estate sector (increase of 1.02%). Other notable increases include a .48% and .40% in the Construction and Government sectors, respectively. The largest declines are in Services and Manufacturing which exhibit -.88% and -.77%, respectively.

Nevertheless, the Services sector represents by far the largest percentage of total employment in 2038 at 43.73% followed by Finance, Insurance and Real Estate (13.48%). Further, the largest numeric increase (i.e. in actual count of jobs) is in the Services sector where 38,725 jobs are added.

The industries that represent the smallest percentage of total employment in 2038 are Natural Resources (.80%), Wholesale Trade (3.79%), Manufacturing (4.15%), and Transportation, Communication and Public Utilities (5.67%). No overall job losses are reported for any industry category.

The consensus total employment forecast by year is provided on the next page in Table 8.
Table 8

Washoe County Consensus Total Employment 2018 – 2038

<table>
<thead>
<tr>
<th>Year</th>
<th>Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>304,135</td>
</tr>
<tr>
<td>2019</td>
<td>311,056</td>
</tr>
<tr>
<td>2020</td>
<td>317,776</td>
</tr>
<tr>
<td>2021</td>
<td>323,016</td>
</tr>
<tr>
<td>2022</td>
<td>327,562</td>
</tr>
<tr>
<td>2023</td>
<td>331,293</td>
</tr>
<tr>
<td>2024</td>
<td>334,552</td>
</tr>
<tr>
<td>2025</td>
<td>337,452</td>
</tr>
<tr>
<td>2026</td>
<td>340,356</td>
</tr>
<tr>
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<td>343,662</td>
</tr>
<tr>
<td>2028</td>
<td>346,864</td>
</tr>
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<td>350,181</td>
</tr>
<tr>
<td>2030</td>
<td>353,730</td>
</tr>
<tr>
<td>2031</td>
<td>357,314</td>
</tr>
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<td>2032</td>
<td>361,247</td>
</tr>
<tr>
<td>2033</td>
<td>365,252</td>
</tr>
<tr>
<td>2034</td>
<td>369,220</td>
</tr>
<tr>
<td>2035</td>
<td>373,132</td>
</tr>
<tr>
<td>2036</td>
<td>377,032</td>
</tr>
<tr>
<td>2037</td>
<td>380,731</td>
</tr>
<tr>
<td>2038</td>
<td>384,713</td>
</tr>
</tbody>
</table>

Source: Woods and Poole and Global Insight (calibrated). For more information see Appendices B, C and F.
Income

Total personal income is expected to grow from $21,794,157,000 in 2018 to $35,562,973,500 in 2038. This represents the total personal income received by persons from wages and salaries, other labor income, and transfer payments less personal contributions for social insurance as adjusted for place of residence. All personal income data are presented in 2009 dollars. This is used to measure the “real” change in earnings and income when inflation is taken into account. The consensus forecast for total personal income for each year is shown in Table 9.

Table 9

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Personal Income (2009 $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>$21,794,157,000</td>
</tr>
<tr>
<td>2019</td>
<td>$22,549,148,000</td>
</tr>
<tr>
<td>2020</td>
<td>$23,271,217,000</td>
</tr>
<tr>
<td>2021</td>
<td>$24,001,288,000</td>
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<tr>
<td>2022</td>
<td>$24,647,297,000</td>
</tr>
<tr>
<td>2023</td>
<td>$25,247,316,500</td>
</tr>
<tr>
<td>2024</td>
<td>$25,830,450,000</td>
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<td>2025</td>
<td>$26,438,598,000</td>
</tr>
<tr>
<td>2026</td>
<td>$27,056,617,000</td>
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<tr>
<td>2027</td>
<td>$27,706,284,500</td>
</tr>
<tr>
<td>2028</td>
<td>$28,363,464,500</td>
</tr>
<tr>
<td>2029</td>
<td>$29,036,176,500</td>
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<td>2030</td>
<td>$29,681,162,000</td>
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<td>2031</td>
<td>$30,381,645,000</td>
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<td>2032</td>
<td>$31,098,142,000</td>
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<tr>
<td>Year</td>
<td>Value</td>
</tr>
<tr>
<td>------</td>
<td>---------------</td>
</tr>
<tr>
<td>2033</td>
<td>$ 31,807,072,500</td>
</tr>
<tr>
<td>2034</td>
<td>$ 32,540,140,000</td>
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<tr>
<td>2035</td>
<td>$ 33,283,008,000</td>
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<tr>
<td>2036</td>
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<tr>
<td>2037</td>
<td>$ 34,819,826,000</td>
</tr>
<tr>
<td>2038</td>
<td>$ 35,562,973,500</td>
</tr>
</tbody>
</table>

Source: Global Insight and Woods and Poole.
The consensus forecast for per capita personal income for each year is listed below:

**Table 10**

Washoe County Per Capita Personal Income, 2018 – 2038

<table>
<thead>
<tr>
<th>Year</th>
<th>Per Capita Personal Income (2009 $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>$46,604</td>
</tr>
<tr>
<td>2019</td>
<td>$47,581</td>
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<td>2020</td>
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<td>$49,476</td>
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<td>$50,272</td>
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<td>$50,958</td>
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<td>2024</td>
<td>$51,603</td>
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<td>2025</td>
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<td>$53,638</td>
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<tr>
<td>Year</td>
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</tr>
<tr>
<td>2038</td>
<td>$61,526</td>
</tr>
</tbody>
</table>

Source: Global Insight and Woods and Poole.

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Jurisdictional Splits

Note: For the purpose of preparing this forecast document for final review as indicated in the Regional Planning Governing Board Rules on Procedure we have implemented jurisdictional splits using the traditional methodology as outlined below. However, these population shares by jurisdiction or specified planning areas (e.g. TODs) are subject to change during the 2019 Regional Plan Update (in process).

Reno, Sparks and Washoe County use the Governor’s certified population estimates of 2017 as a starting point for determining jurisdictional forecast splits for the year 2038.

Table 11

2017 Governor’s Certified Population Estimates*

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Population 2017</th>
</tr>
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<tbody>
<tr>
<td>Washoe County Total 2017</td>
<td>451,923</td>
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<tr>
<td>Reno City Total 2017</td>
<td>244,612</td>
</tr>
<tr>
<td>Sparks City Total 2017</td>
<td>96,928</td>
</tr>
<tr>
<td>Unincorporated Washoe County Total 2017</td>
<td>110,383</td>
</tr>
</tbody>
</table>

*Note: Cooperatively, Washoe County and the Nevada State Demographer prepare annual population estimates for Washoe County for July 1 of each year.

In 2017, each jurisdiction contained the following percent of total population:

Table 12

2017 Jurisdictional Percent of Total Population

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reno Percent of Total</td>
<td>54.13%</td>
</tr>
<tr>
<td>Sparks Percent of Total</td>
<td>21.45%</td>
</tr>
<tr>
<td>Unincorporated Washoe County Percent of Total</td>
<td>24.42%</td>
</tr>
</tbody>
</table>

An analysis of historic census and estimated population figures since 1980 shows these jurisdictional percentages have remained relatively stable over time, with little apparent impact attributable to previous regional plans (prior to the 2012 Truckee Meadows Regional Plan Update) or conforming jurisdiction master plans.

In this 2018 Consensus Forecast, there is a desire to reflect a potential impact of the 2012 Truckee Meadows Regional Plan, as amended, on jurisdictional shares of population through the year 2038. The
influence of plan policies on growth and development patterns, and the possible impacts on future settlement patterns are the subject of significant debate and reflect a different approach to forecasting in a multi-jurisdictional environment than forecasts based on a mere reflection and continuation of historic trends. While all forecasts reflect inherent uncertainties, especially in regions with highly variable decadal growth rates, forecasts associated with regional plan policies can provide a useful guide, over time, as to the effectiveness and need for amendment of such growth policies.

The year 2038 Washoe County Consensus Forecast of 558,746 persons exceeds the 2017 Governor’s certified estimate of 451,923 by a growth increment of 106,823 persons.

Reno, Sparks and Washoe County have decided to allocate the growth increment of 106,823 persons in the following manner:

<table>
<thead>
<tr>
<th>Table 13</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Growth Increment Allocation</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>25% of Growth Increment (26,706 persons) at Year 2038</th>
<th>Allocate to Centers, TOD Corridors, Emerging Employment Centers in Reno and Sparks</th>
</tr>
</thead>
<tbody>
<tr>
<td>75% of Growth Increment (80,117 persons) at Year 2038</td>
<td>Allocate based on adjusted jurisdictional shares of population of 50% City of Reno, 24% City of Sparks and 26% Unincorporated Washoe County.</td>
</tr>
</tbody>
</table>

The approach that allocates 25% of the growth increment to Centers, TOD Corridors and Emerging Employment Centers recognizes that the 2012 Regional Plan policies may have increasing impact over time. Thus, the growth increment attributed to these policies increases from 2018 to 2038 in a linear fashion. Interpolation of jurisdictional population forecasts from 2018 to 2038 is the responsibility of each jurisdiction and is addressed in local population master plan elements, if desired. This consensus forecast establishes only the beginning (2017 certified estimates) and end points (allocated 2038 consensus forecast by jurisdiction) of that forecast series for each jurisdiction through the year 2038.

Analysis of the 25% population increment (26,706 persons) allocated to each jurisdiction’s Centers, TOD Corridors and Emerging Employment Centers (EECs) yielded the following assumptions based on corridor, center and emerging employment center land areas and density assumptions:

- 21.3% (i.e. 85.2% of 26,706) of the increment will be allocated to the City of Reno (22,745 persons);
- 3.7% (i.e. 14.8% of 26,706) of the increment will be allocated to the City of Sparks 3,952 persons).

While the City of Sparks has major emerging employment centers in its jurisdiction, it is recognized that these EECs have lower densities than centers and corridors and that these EECs are located in or near to
Sparks’ traditional growth areas. Spark’s EECs, however, are extremely important to jobs-housing balance and trip reduction policies.

Recent changes, implemented during the 2012 Regional Plan update, allow for the creation and designation of Secondary Transit Oriented Development Corridors. Although these areas correspond with principal transportation routes, they are typically further from core areas such as downtown Reno and exhibit lower densities when compared to Primary Transit Corridors. Portions of the existing Transit Oriented Development Corridors within the City of Reno were downgraded to Secondary Transit Corridors following the adoption of the 2012 Regional Plan.

In the future, Washoe County is expected to designate at least one Secondary Transit Corridor and to designate Infill Opportunity Areas under the policies of the 2012 Regional Plan. Under the forecast approach of the Consensus Forecast, Washoe County may analyze the impact of these designations and include any appropriate and related population shares in its Population Element to be submitted to the Regional Planning Agency.

Allocation of the remaining (non-centers, corridors and EEC) growth increment (75% or 80,117 persons) to the jurisdictions is based upon a minor modification of the historic jurisdictional distribution of population, as follows:

<table>
<thead>
<tr>
<th>Table 14</th>
</tr>
</thead>
<tbody>
<tr>
<td>2038 Jurisdictional Distribution of Population (of remaining growth increment)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>2038 Allocation</th>
<th>50%</th>
<th>40,059 persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Reno</td>
<td></td>
<td>50%</td>
<td>40,059 persons</td>
</tr>
<tr>
<td>City of Sparks</td>
<td></td>
<td>24%</td>
<td>19,228 persons</td>
</tr>
<tr>
<td>Unincorporated Washoe County</td>
<td></td>
<td>26%</td>
<td>20,830 persons</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 2038 Total Jurisdiction Forecasts</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>2017 Certified Estimates</th>
<th>Centers, Corridors and EEC Increment</th>
<th>Remaining Increment</th>
<th>2038 Jurisdiction Forecast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reno</td>
<td>244,612</td>
<td>22,754</td>
<td>40,059</td>
<td>307,425</td>
</tr>
<tr>
<td>Sparks</td>
<td>96,928</td>
<td>3,952</td>
<td>19,228</td>
<td>120,108</td>
</tr>
<tr>
<td>Unincorporated Washoe County</td>
<td>110,383</td>
<td>N/A</td>
<td>20,830</td>
<td>131,213</td>
</tr>
<tr>
<td>Total County</td>
<td>451,923</td>
<td>26,706</td>
<td>80,117</td>
<td>558,746</td>
</tr>
</tbody>
</table>
Appendix A

Consensus Forecasts in Planning

By Michael R. Sykes*

Planners know, in many industries macro forecasts are regularly used as inputs to the planning process, often to establish a starting point or a broad framework of assumptions within which the more specific problems under consideration can be examined. For many businesses, product demand in a given market that is sensitive to the strength of economic activity may be well correlated with the behaviour of one or more broad macroeconomic indicators. For example, demand for semiconductor chips in many markets has historically been relatively well correlated with growth in overall industrial production, which is therefore often considered by sector analysts as the best indicator to use in predicting future chip demand. One major industrial company also focuses on expected industrial production growth in various (mainly European) markets, as an indicator of future demand for ball bearings and other products widely used in the industrial production processes.

Obviously, obtaining a reliable set of forecasts for a macroeconomic variable in various countries or markets is far from being the whole story: the relationship between industrial production and demand for computer chips may vary quite widely across markets, depending, for example, on the level of technology employed. Information or knowledge that is more specific to the industry, or to the past experience of the individual firm, also will be necessary. Thus, extrapolating historical relationships between demand for a product and a macroeconomic indicator is a widely used approach but is dependent upon the quality of both the interpretation of events and the macro benchmark forecasts used.

THE ECONOMIC CYCLE

In the short term, predictions of the timing of turning points in the economic cycle also can be invaluable in reaching decisions on production, inventory and manning levels, marketing strategies

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*Michael R. Sykes is a Director of Consensus Economics, Inc., London.

January 1983
CHANGING EXPECTATIONS

Expectations regarding future trends in output, inflation, or other macro variables can change quite rapidly over time, suggesting that forecasts for demand growth in different countries made even a few months apart might provide misleading comparisons. The outbreak of the Gulf crisis in August 1990, for example, marked the beginning of a nine-month period during which 1991 growth forecasts for most economies were revised sharply and continuously downwards. In the United Kingdom, where the gathering gloom was compounded by the realization that tight monetary policy was finally beginning to bite, the deterioration in the consensus outlook for GDP growth and Manufacturing Production was particularly severe (see Figure 1).

Such rapid shifts in expectations can obviously pose problems for companies where the planning cycle involves relatively infrequent reviews of the forecasts underlying the plan. A company conducting an annual forecast review for the United States in August 1990, for example, would, by the beginning of 1991, have found itself with a plan based on assumed GDP growth for 1991 of 2 percent. In the meantime, however, the average independent growth forecast had deteriorated to the point where the economy was expected to contract by around 0.3 percent. Changes in expectations of this magnitude, and wars in the Gulf, are thankfully relatively rare occurrences, but even under more normal circumstances, expectations can shift quite rapidly over a few months. Since the beginning of 1992, for example, consensus forecasts for growth in Japanese industrial production have declined.

Figure 1
Consensus Forecasts for U.K. Growth
1991

(Cross country comparisons)

Over a longer time horizon, the expected relative performance of various economic indicators in different countries can be a useful guide in reaching decisions about the location of production units, distribution networks, and marketing investment. Equally, expected developments in relative wage costs and inflation rates may have a significant bearing on investment or other location decisions. One of the problems here is likely to lie in finding forecasts for all the individual countries under consideration that have been produced on a simultaneous and consistent basis as possible.

and pricing. In the trough of an economic cycle, weak demand is likely to mean that producers are facing strong competition for the few available orders, are running plant at well below full capacity and have cut inventory and rationing levels. In spite of the rising unit labour costs that usually accompany a downturn in output, producers may be under considerable pressure either to cut prices or to offer significant discounts, and profit margins are inevitably squeezed. The question of whether to cut employment further in order to reduce costs, or possibly to close or scrap plant, will depend to a considerable extent on when and from what level the economy is expected to begin recovering. Producers will not wish to find themselves having cut capacity and employment as the economy is about to turn up, and also will wish to be well positioned from a marketing standpoint as demand begins to revive.

The economic cycle in different industrial sectors is frequently out of phase with that of the economy overall, however. In many countries, for example, construction sector activity turns down ahead of demand in the economy as a whole and often leads the revival. Producers of construction-related materials and equipment therefore also will feel the effects of a downturn and the subsequent revival relatively early. On the other hand, business investment often responds more slowly to a recovery in overall output, as producers first take up the excess capacity resulting from recession before investing in new plant. But even so, in examining either the short-term influence of economic cycles or the longer-term outlook, once a general relationship between demand for a particular product and a broad indicator of total output (such as gross domestic product [GDP] or industrial production) has been established, macroeconomic forecasts adjusted for leads or lags can be used to "drive" a more specific model of demand for the individual sector or product.
from an average of +1.3 percent to the −3.9 percent now being predicted (early June 1980). Such developments highlight the need for a reliable stream of regularly updated forecasts and a close monitoring of shifts in expectations. In many circumstances a flexible approach to reviewing established plans outside the normal six months or one year cycle and a willingness on the part of business economists to raise the red flag are clearly important. It should at least be possible to draw the attention of others involved in later stages of the planning process to such developments, even if a full scale review is impractical. In view of the difficulties that may be involved in disrupting the planning process in this way, however, it is important that the forecasts used to trigger such changes derive from a consistent and credible source. The choice of this source is therefore an important decision.

THE FORECAST SOURCE

The choice of forecast source is complicated by the large number and wide diversity of economic forecasting operations. These may be large international consultancy-type firms specializing in economic forecasting and analysis, government or semi-government institutions such as the OECD, university research units, divisions of major banks or securities firms, or the in-house economic units of large industrial companies. Our company surveys over 180 economic forecasters based in the C-7 countries and Australia every month (of which about 35 are in the United States), and this is by no means an exhaustive list of the available sources. Blue Chip Economic Indicators covers about 50 U.S. forecasters in its principal American panel.

Comparing forecasters’ track records is made more complicated by the fact that forecast errors vary in type and can have different consequences for the forecast user. For example, forecasters may correctly predict the direction of change in a series, but get the magnitude wrong (under or overpredicting investment growth, for example). This kind of forecasting error is, however, probably less damaging to the forecast user than a prediction that gets the direction of change wrong (forecasting a rise when the series in fact falls). From the users’ point of view, a forecaster who accurately predicts trends but fails to spot turning points may well deserve a lower rating than another who correctly predicts turning points but has a poorer track record at other times. More generally, a good track record does not guarantee consistent success. The fact that a forecaster performed well in predicting economic developments for one or two years does not mean that he or she will continue to do so. Indeed, some of the more recent evidence from studies of forecasting accuracy (reviewed below) indicates that past success is no guarantee of future accuracy. The problem is compounded when forecasts for a range of different variables are considered. One forecaster may have a better track record on production growth, but a poor record on inflation. These results might be combined or weighted in some way, but how is a percentage error in forecasting inflation to be rated vis-à-vis an absolute error in volume terms in a forecast for housing starts, for example? The relative importance of the different variables will vary from user to user.

THE CONSENSUS APPROACH

All of this suggests that successfully differentiating among the large number of different forecasts available is a complex and challenging task. One possible solution to this problem of “picking winners” is to use aggregated or consensus forecasts, combining the predictions of a number of different forecasters into a single, mean forecast. The idea of using consensus projections is fairly well established in a number of countries, notably in the United States, where surveys of forecasters have been running for some time. Aside from reducing some of the problems of choice and weighting discussed above, the use of a consensus projection also appeals to many users because it does not rest on one particular view of the way an economy functions, but attempts to capture the information implicit in a range of forecasts. The results of these surveys have also attracted a good deal of academic interest and analysis, and several studies of the merits of consensus forecasting as an approach have been conducted.

Much of this work has concentrated on forecasts produced by various time series methods of extrapolation for individual series, although there have also been other studies comparing econometric or judgmental forecasts with the consensus. Most of these studies are based on data for the United States, where a long run of consistent back data is available from the surveys published in Blue Chip Economic Indicators over the past fourteen years. As regards the accuracy of the consensus, the verdict of most of the academic work in this area has generally been favourable. In his study covering forecasts for seven variables made by twenty-two forecasters over nine years (1976 through 1986) Stephen McNeese concluded that “only four of the twenty-two individual forecasters were more accurate than the consensus in more than half their forecasts.” For all seven variables weighted equally,
the consensus forecasts ranked 6 (out of 23, including the consensus) on the basis of the RMSE (root mean squared error) criterion.

In addition, McNees noted that:

"For any particular variable, the Blue Chip consensus was more accurate than most individual forecasters but less accurate than a majority of varying size depending on the predicted variable. Every forecaster, except one, was more accurate than the consensus for at least one variable but none of the forecasters outperformed the consensus for all seven variables." 7

Another study comparing seventy-nine individual forecasts of six macroeconomic variables with the group mean found that, on average, the consensus was more accurate than around three-quarters of the individual forecasts, although again this proportion varied depending on the variable considered. On the basis of this evidence, which is broadly consistent with our own experience, it seems reasonable to assume that for some variables some of the individual forecasts making up the consensus will prove to be more accurate than the group mean when the results become known. However, the problem for a user of external forecasts remains how to determine in advance which individual forecasters will be more accurate. This would be a relatively simple task if some forecasters were clearly superior to the others and consistently achieved better results.

In fact, the evidence on this question is rather mixed. Victor Zarnowitz examined forecasts submitted to the survey conducted by the American Statistical Association (ASA) and the National Bureau of Economic Research (NBER) from 1958 to 1970, and concluded (by comparing rank correlations of relative RMSEs across variables and forecast horizons) that "a small number of the more regular participants in the ASA-NBER surveys did perform better in most respects than the composite forecasts from the same surveys." 8

On the other hand a later analysis conducted by Roy Batchelor of the City University Business School in London concluded that there were "no significant differences in the accuracy rankings of individual forecasters." This conclusion supports the argument that, without the benefit of hindsight, it is extremely difficult to pick out an individual forecaster who is likely to outperform the consensus across a range of variables and time horizons. As noted above, however, for certain variables considered in isolation the evidence does suggest that selected forecasters can perform consistently well.

THE MARKET FOR FORECASTS

There are a number of problems involved with the use of consensus forecasts. One is the choice of which forecasters to include in the consensus. However, given the competitive nature of the forecasting business (large numbers of suppliers, fairly standardized products, very low or nonexistent barriers to entry, etc.) inaccurate forecasters, or those lacking professional credentials, might be expected to be driven out of business, leaving a group of forecasters producing work of a similar quality. This is supported by the Batchelor study, which finds no evidence of significant differences in forecasters' track records. In a separate study, Batchelor also finds that, perhaps because of this high level of competition in the forecasting business, some forecasters may attempt to differentiate their work by deliberately adopting a stance that is either pessimistic or optimistic in relation to their peers. Far from moving towards the consensus, some forecasters display "variety seeking" behavior and attempt to distance themselves from the middle ground to some extent. Those that are determinedly optimistic year after year will almost certainly at some stage, be proved correct when the outcome is better than the consensus predicted. Intuitively, this also ties in with the results showing that few forecasters beat the consensus consistently; neither the optimists nor the pessimists can always be right. This kind of behavior probably reflects the fact that forecasts, like other types of information, are themselves a marketable commodity. From some perspectives, the middle ground may appear less valuable or interesting and thus more difficult to sell commercially. Thus accuracy may not always be the only consideration for the forecast producer, given that he is operating in a competitive market. This leads to another caveat regarding the interpretation of consensus projections. The range or spread of different forecasts, which is often measured by the standard deviation of the sample, is frequently used as a measure of the "risk" or uncertainty attached to a consensus forecast. Clustering around the mean might, however, produce a range of forecasts that considerably understates the wide dispersion of likely outcomes, with the result that the deviation in the sample is considerably lower than the "risk" inherent in the forecast. This is reflected in the fact that the actual outcome for a particular variable is frequently outside the range of forecasts. In our experience, we have noted that the dispersion of forecasts may also vary widely from country to country. For example, the forecasts for the French economy produced (on a monthly basis) by a group of around sixteen French-based fore-
The forecasts over the past two years have typically been much more closely grouped around the mean than those produced by a similar group of United States forecasters looking at the American economy. This may reflect structural differences between the two economies (the French economy may be more predictable, for example) or it may reflect more widespread attempts at product differentiation in the U.S. forecasting industry. So caution should be exercised when using forecast ranges to assess the uncertainty attached to the consensus. As always with a table of comparative forecasts, moreover, the astute analyst will endeavour to look past the numbers at the reasoning that lies behind them.

FOOTNOTES

2. Ibid.
Appendix B

February 2018
Long-Term Forecast
Prepared by IHS ECONOMICS
Washoe County, NV

Preface
This analysis accompanies a forecast prepared by IHS Markit Economics for the Washoe County Office of the County Manager. The forecast pertains to Washoe County, which comprises the cities of Reno and Sparks, and the unincorporated remainder of the county. Some sections of this document will refer to the Reno Metropolitan area, using it as an approximation of activity in Washoe County. These sections will be clearly marked using the notation Reno MSA.

Recent Performance
Employment growth in Washoe County has been impressive in recent years. In 2016, Washoe County employment surged 4.5% year-over-year (y/y), but did soften in 2017 with growth of 1.3% due in part to a downturn in construction hiring. We expect construction employment to rebound this year which will bring 2018 growth up to 2.5%, well ahead of the national average. Payroll gains in recent years have been broad-based but fastest in the leisure/hospitality, construction, and business service sectors. These sectors were also among the hardest hit during the 2009 recession and thus are coming back from depressed levels. Despite a streak of annual payrolls gains going back to 2012, the Reno metropolitan area (MSA) did not recoup all of its recessionary job losses until mid-2017, a testament to how hard the area was hit during the downturn. Nevertheless, with the losses finally recouped the MSA and county are poised to hit new highs in employment levels over the coming years as long as the national economy keeps churning along with risks of a US recession relatively low over the near-term. Reno will get a further boost from expanding transportation and manufacturing operations in the MSA with the Tesla Gigafactory representing the largest investment.

The unemployment rate in the Reno MSA, which is comprised primarily of Washoe County, has fully recovered from the painfully high rates during the recession that reached a peak of 13.1% in December 2010. By November of 2017, unemployment had edged down to 4.2%, a product of continual progress over the past few years. Unemployment is now close to the national average after exceeding the national rate from 2008 to 2016. This is a good indicator of the economic progress the MSA has made. Unemployment is back down to “normal” levels with concerns moving away from a large pool of unemployed to tightening labor markets which can constrain job growth.

Looking more closely the local economy, we can see where future growth is likely to come from:

- **Personal Income**: Personal income in Washoe County increased by 3.4% in 2016, according to the Bureau of Economic Analysis, the latest data available. This is a good result, ahead of Nevada and the US average, buoyed by strong growth in the labor market. From 2017 to 2022 personal
income growth will average about 5.2% annual as continued strength in the job market helps keep growth above the national pace according to IHS Markit Economics analysis.

- **Trade, Transportation, and Utilities:** This sector, which is the largest in the Washoe County economy, at 22% of total employment, saw payroll declines from 2008 through 2011. The sector managed to turn around and squeak out a 0.7% gain in 2012 and 1.1% gain in 2013. Growth finally came on strong in 2014 and has remained robust since, averaging 3.5% through 2017, and will continue to be an important source of job gains in the near term. Washoe County is becoming a hub for logistics and warehousing thanks to its strategic location and low cost of doing business.

- **Tourism and Gaming:** Leisure and hospitality employment, which includes jobs in accommodation and eating and drinking establishments, is the second largest employment sector in Washoe County and in the Reno MSA, accounting for 17% of total employment. This sector saw employment growth decline during the first recession of the decade, beginning in 2001 and reaching its lowest point in 2005. Thereafter, a strong national economy and expansion in the region’s gaming industry helped employment rebound through 2007, before the Great Recession brought growth to a halt again in 2008. A subsequent decline in 2009 was a result of weak economic conditions and restrained consumer spending. Growth in leisure and hospitality then essentially remained flat from 2010-2012, as still-shaky consumer confidence sapped demand from Washoe County’s large gaming industry. However, with the recession behind us, the leisure and hospitality sector took a sharp upward turn in 2013, and has continued steady gains since with payrolls up 2.5% y/y in 2017. Gaming revenues have also been solid. Travel and spending is being support by a strong labor market and high consumer confidence and spending.

- **Services:** The professional and business services sector has been an important source of job growth in recent years. The pace in 2017 represented a downshift, up 2.2%, after averaging 4.5% from 2012-16. This will be a temporary soft patch with solid economic fundamentals driving business service expansion in the coming years. The education and health services sector, accounting for 12% of total employment, has been a consistent job creator, thanks to largely inelastic demand for its services. Its job growth has been solid, advancing another 3.9% y/y in 2017.

- **Housing:** The combined construction/mining employment sector in Reno expanded by 5.7% y/y in 2017. This continues what has been a good stretch for construction hiring, the sector gained an average of 10.7% annually from 2012-17. Construction hiring has been on a tear, in-part because it is coming back from such severe recessionary declines. Construction employment plunged 64% from early 2006 to mid-2011. Construction employment has increased by 70% from 2011 to 2017 but still remains about 35% below the 2006 peak. While strong growth in construction is on the horizon over the medium-term, it will not be until the mid-2020s before levels get back to the levels seen during the 2006 height of the housing speculation years.

- **Manufacturing:** This sector accounts for almost 7% of total employment in Reno, and had flat-to-positive job growth between 2003 and 2007 – indeed, the MSA is one of the few metro areas in the nation that did not see significant declines in manufacturing through the early years of the decade. In 2008, however, the sector felt the impacts of the recession, leading to payroll losses that topped out in 2009, although declines continued in 2010. Things have turned around since: the sector then saw robust gains from 2012 to 2017 and with further Tesla-related development in the coming years the industrial sector has a bright outlook.
The Census Bureau and IHS Markit Economics estimated Washoe County's population to be 454,600 residents in 2016, up from 446,600 persons in 2015. The annual population growth rate between 2015 and 2016 was 1.8%, ranking 3rd out of the seventeen counties in the state. Comparatively, growth rates in the Las Vegas metro area, in Nevada, and in the United States over the same period were 2.2%, 2.0%, and 0.7%, respectively.

Reno's population also increased by 1.8% in 2016. Looking back, from 2010 to 2016, Reno experienced population growth of 16%, which placed it 54th out of the 381 metro areas. While this ranking is not as high compared to the first ten years of the 2000s, in part because of the inflated growth around the housing bubble, it still ranks well with population on a steady upward trend since the Great Recession. Strong population growth is a corner stone in Las Vegas as well: from 2010 to 2016, Las Vegas saw an increase in population of 18%, ranking them 36th in the nation.

Another way of looking at population data is at the total number of households, a primary driver of demand for housing units, infrastructure, and government services. In Washoe County, household numbers rose from 162,800 in 2010 to 172,400 in 2016, according to American Community Survey data and IHS Markit Economics. The average household size in Washoe County remained steady at 2.59 persons in 2010 to 2.60 persons in 2016. The county is getting older – in 2010, 34.1% of the population were 24 years and younger, while 12.2% were 65 years and older; by 2016, these proportions fell to to 31.8% for residents 24 and under and leaped to 16.0% for residents 65 and older.

As Washoe County's population has grown so has its population density which increased from 64.6 persons per square mile in 2010 to 69.5 persons per square mile in 2016. This is much higher than the state average; Nevada’s population density in 2016 was only 26.7 persons per square mile. However, the
county still trails the US average by a wide margin with the national population density registering 85.2 persons per square mile.

Both Reno’s and Nevada’s unemployment rates surged during the recession, but rates have come down markedly since. In the Reno MSA, the seasonally adjusted unemployment rate was down to 4.2% in November 2017; by comparison, the rates for Nevada and the United States were 5.0% and 4.1%, respectively, in November. Despite declines from double-digit rates, the forces lowering the jobless rate have not been entirely good news. Stubbornly high joblessness and tepid job growth has led to a flat lining of Reno’s labor force growth. From early 2011 to late 2013 Reno’s labor force was essentially flat, signaling that many people that lost their jobs during the recession have given up looking and thus are not counted in the unemployment rate estimates. Labor force growth picked up gradually in 2014 but then took off from 2015 onward. This is a great sign for the metro economy and indicates that confidence in the labor market is returning. Growth in the labor force will be strong over the medium-term.

**INCOME AND WAGES**

According to the Bureau of Economic Analysis, in 2016 per capita personal income in the Reno MSA was $49,500, the 72nd highest in the United States, well above the Nevada figure of $43,500, and on par with the US ($49,200). In terms of growth rates, the Reno MSA’s 2016 per capita personal income was up 1.5% over 2015, compared to increases of 1.0% in Nevada and 1.6% for the United States. According to the BLS, in the second quarter of 2017, the average weekly wage of private industries in Washoe County was $877, up 2.6% from the second quarter of 2016. The average weekly wage in Clark County (Las Vegas) was lower, at $863, while the figure for the United States was higher at $1,010. Wages in Reno and Nevada are weighed down by the high concentration of lower paying hospitality jobs.

The Bureau of Labor Statistics has released the following average weekly wage data for private industries in Washoe County and Nevada for the second quarter of 2017:

<table>
<thead>
<tr>
<th>Sector</th>
<th>Washoe County</th>
<th>Nevada</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Resources and Mining</td>
<td>$919</td>
<td>$1,557</td>
</tr>
<tr>
<td>Construction</td>
<td>1,060</td>
<td>1,095</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>1,138</td>
<td>1,094</td>
</tr>
<tr>
<td>Trade, Trans, &amp; Utilities</td>
<td>815</td>
<td>824</td>
</tr>
<tr>
<td>Information</td>
<td>1,241</td>
<td>1,176</td>
</tr>
<tr>
<td>Financial Activities</td>
<td>1,349</td>
<td>1,181</td>
</tr>
<tr>
<td>Professional &amp; Business Svcs</td>
<td>1,032</td>
<td>1,040</td>
</tr>
<tr>
<td>Education &amp; Health Services</td>
<td>994</td>
<td>1,002</td>
</tr>
<tr>
<td>Leisure &amp; Hospitality</td>
<td>456</td>
<td>620</td>
</tr>
<tr>
<td>Other Services</td>
<td>727</td>
<td>691</td>
</tr>
<tr>
<td>Total, All Private Industries</td>
<td>877</td>
<td>877</td>
</tr>
</tbody>
</table>
Washoe County’s 20 largest employers are listed below (as reported by the state of Nevada for the second quarter of 2017).

- Washoe County School District, elementary and secondary schools: 9,000 to 9,499 employees
- University of Nevada-Reno, colleges and universities: 4,500 to 4,999 employees
- Renown Regional Medical Center, general medical and surgical hospitals: 3,000 to 3,499 employees
- Washoe County Comptroller, executive and legislative combined: 2,500 to 2,999 employees
- Peppermill Hotel and Casino, casino hotels: 2,000 to 2,499 employees
- Grand Sierra Resort and Casino, casino hotels: 2,000 to 2,499 employees
- Silver Legacy Resort, casino hotels: 2,000 to 2,499 employees
- International Game and Technology, misc. manufacturing: 1,500 to 1,999 employees
- Atlantis Casino Resort, casino hotels: 1,500 to 1,999 employees
- St. Mary’s Hospital, general medical and surgical hospitals: 1,500 to 1,999 employees
- Eldorado Hotel and Casino, casino hotels: 1,000 to 1,499 employees
- City of Reno, executive and legislative combined: 1,000 to 1,499 employees
- Sierra Nevada Healthcare Systems, general medical and surgical hospitals: 1,000 to 1,499 employees
- Nugget Casino Resort, casino hotels: 1,000 to 1,499 employees
- United Parcel Service, couriers: 1,000 to 1,499 employees
- Truckee Meadows Community College, Junior Colleges: 1000 to 1499 employees
- Circus Circus Casinos - Reno, casino hotels: 800 to 899 employees
- Arrow Electronics Inc., electronic parts and equipment wholesaler: 600 to 699 employees
- Amazon.com, general warehousing and storage: 600 to 699
- City of Sparks, executive and legislative offices: 600 to 699 employees

Of the county’s 20 largest employers, seven are casinos. Because of the dominant presence of the casino industry, Washoe County has a unique economic structure compared to the US economy. As mentioned above, the leisure and hospitality sector, which includes accommodations and eating and drinking establishments, accounted for 17% of Washoe County’s total employment in 2017, well ahead of the US economy’s 11% share. The construction industry also used to be a major presence here, but because of the large layoffs during the recession, the construction and mining sector accounted for only 6.7% of Washoe County’s total employment in 2017, down from 10.8% in 2006. This concentration is now above the US average after several year of strong growth and is about the same size as the county’s relatively small manufacturing sector, which accounts for 6.1% of Washoe County’s 2017 employment, compared to 8.4% in the United States.

The following table compares employment distribution by major sector for Washoe County, Nevada; the Mountain Census region (i.e., AZ, CO, ID, MT, NV, NM, UT, and WY); and the United States. The table confirms the importance of the leisure and hospitality sector in both Washoe County and in Nevada, and shows clearly how much the structure of their economies varies from the rest of the Mountain region states and from the United States.
To gain even greater insight into the local economy, IHS Markit Economics conducted a shift-share analysis to identify the changes in Washoe County’s economic structure during the last 25 years. This change, as measured by the distribution of private sector employment by three-digit NAICS code, was compared to the employment changes that occurred in the United States over the same period. The purpose of the analysis was to identify four crucial types of economic sectors, enumerated below.

**Type D: Competitive Advantage and Specialized.** Competitive advantage means that an individual sector’s employment growth rate in Washoe County over the last 25 years was higher than its employment growth rate at the US level over the same period. Specialized means that the same sector’s percent share of total Washoe County employment is higher than the sector’s percent share of total US employment (i.e., its location quotient is >1.0). Sectors in this category are major sources of growth in a regional economy, as they have both above-average shares of regional activity, and above-average growth rates. Higher growth rates for these sectors presumably occur because of the competitive advantages (e.g., labor costs, agglomeration effects, skilled labor, proximity to market, lower cost of living, etc.) that attracted them into a region in the first place. Approximately 45% of Washoe County’s 2017 employment is in sectors classified as type D. This has risen sharply in recent years as two large sectors, NAICS 722 and 238, moved up to type D due to robust expansion. The top-five sectors in this category, based on total employment, are:

- Food Services and Drinking Places (NAICS 722)
- Administrative and Support Services (NAICS 561)
- Specialty Trade Contractors (NAICS 238)
- Warehousing and Storage (NAICS 493)
- Miscellaneous Manufacturing (NAICS 339)
Type C: Competitive Advantage but not Specialized. This type consists of sectors whose employment growth rate in Washoe County over the past 25 years was higher than the sector’s growth rate at the US level, but also where the current shares of total county employment are less than their shares of total US employment. Economic sectors classified as Type C present targets of opportunity, as Washoe County may have competitive advantages that enable these sectors to achieve above-average growth rates. Approximately 33% of Washoe County’s employed persons in 2017 are classified as Type C. The top-five private sectors in this category, based on total employment, are:

- Professional, Scientific, and Technical Services (NAICS 541)
- Ambulatory Health Care Services (NAICS 621)
- Hospitals (NAICS 622)
- Retail Trade – General Merchandise Stores (NAICS 452)
- Retail Trade – Food and Beverage (NAICS 445)

Type B: Competitive Disadvantage but Specialized. This type is comprised of sectors whose employment growth rates in Washoe County over the last 25 years were below their employment growth rates at the US level, but whose share of total Washoe County employment is higher than their shares of US employment. Type B sectors often comprise major parts of a region’s economy, but their boom years are in the past. Approximately 14% of Washoe County’s 2017 employment is classified as Type B. The top five private sectors in this category, based on total employment, are:

- Accommodations (NAICS 721)
- Merchant Wholesalers, Durable (NAICS 423)
- Amusement, Gambling and Recreation (NAICS 713)
- Retail Trade – Misc. Stores (NAICS 441)
- Retail Trade – Nonstore Retailers (NAICS 454)

Type A: Competitive Disadvantage and not Specialized. This type is comprised of sectors whose employment growth rates in Washoe County over the last 25 years were below their employment growth rates at the US level and whose share of total Washoe County employment is less than their shares of US employment. Type A economic sectors make little contribution to new regional economic growth, and sectors in this class comprised only 7% of Washoe County’s total employment in 2017. The top five sectors in this class are:

- Social Assistance (NAICS 624)
- Religious, Civic, and Professional Organizations (NAICS 813)
- Retail Trade – Building Material and Garden Eq. (NAICS 444)
- Retail Trade – Gasoline Stations (NAICS 447)
- Securities and Other Financial Investments (NAICS 523)
REGIONAL ECONOMIC OUTLOOK

Washoe County is within the Mountain region, which was hit especially hard during the Great Recession due in large part to the collapse in the housing market, especially in Arizona and Nevada. The region has seen strong growth coming out of the recession but because of the severity of the decline, it did not reach its prerecession employment peak until late 2014, or about six months after the US on the whole. As measured by payroll growth, the recovery has been strong and steady with payrolls averaging 2.4% growth over the past five years. This compares to 1.8% for the nation. Across sectors growth has been widespread but most impactful in construction which continues to battle back from ultra-lean levels after the devastating recessionary declines, construction employment remains well below the 2007 levels. The Mountain states continue to be an attractive destination for companies due to their relatively low costs of doing business and ample supplies of labor.

The Mountain division was once again a pacesetter in the fourth quarter of 2017, ranking second among all other divisions with a 1.9% y/y expansion in nonfarm payrolls. Employment growth was broad-based; every major sector of the regional economy added jobs over the past year except the information sector. Manufacturing continued to show strength, adding 2.2% thanks to gains in both the durables and nondurables sectors. The natural resources and mining sector, which has suffered dramatic losses since the collapse in the price of oil at the end of 2014, finally saw an uptick in payrolls in the fourth quarter. Although small, the 1.3% y/y increase was significant in that it was the second gain in 10 quarters. Construction was the fastest-growing sector in the region, adding 5.6% y/y. On the service side, the Mountain division economy was running at full steam. Business services added 2.8%. Education/health services and leisure/hospitality services rose by 2.4% and 2.3%, respectively. The retail sector has held up well compared to other regions, adding 0.6% in the fourth quarter.

Although Utah, Nevada, and Idaho continue to lead the division in terms of job growth, the lagging states of Wyoming and New Mexico have begun to close the gap thanks to recovery in the mining sector. Utah and Nevada saw their labor markets add jobs at a 2.7% and 3.0% y/y pace, respectively, both driven by strong population growth and the construction to go along with it. Nevada has also begun to feel the benefits of a diversifying economy, including that of the Tesla factory in Reno. Gains in Idaho slipped somewhat as its construction sector has cooled. Colorado, Montana, and Arizona remained in the middle of the pack at 1.8%, 1.3%, and 1.3%, respectively. New Mexico continued to plod along at a modest pace. It added 1.4% as its construction sector heated up, yet the headline number was dragged down by further losses in mining. Wyoming was the only state in the division to lose jobs. A significant fourth-quarter surge in the energy sector was unfortunately balanced out by continued losses across much of the service sector, resulting in an overall 0.3% loss.

The region’s ample natural resources provide many outdoor recreation opportunities, drawing skiers, hikers, and other enthusiasts from a wide area. The national economic recovery has provided a huge boost the region’s tourism business, helping to spur hiring in the leisure and hospitality sector. The national parks system is a major presence in the region. The abundance of recreational opportunities is also cited as a factor in the region’s ability to attract young workers, playing a prominent role in the development of the region’s high-tech hubs. On the downside, the region’s robust economic growth is directly tied to robust population growth, which also translates into increasing demands for water. Allocation of the region’s water resources is the subject of ongoing debate among policymakers in the western states who are concerned about future water issues, which will rapidly become present ones unless weather and usage patterns change.
The Mountain region is made up of states that were at the forefront of the housing boom, and thus were affected by the bust more so than other areas. From 2007 to 2010, the region purged 340,000 construction jobs, with more than half of those losses coming from Arizona and Nevada alone. While these deep cuts are painful, with bubbles come extremes at the top and bottom – meaning that as the housing market continues to recover there will be more room for growth because it is coming back from a low base. However, after years of robust expansion the housing recovery is naturally beginning to decelerate but there is still plenty of momentum left for further expansion in the coming years just not as impressive as it has been.

Over the next five years, employment gains in the region will outpace the national average. We expect Utah, Nevada, Arizona, and Colorado to be among the leading states nationally through 2022 in terms of payroll employment growth rates. With domestic migration trends favoring the South and West, many of the states in this region will undergo large investments in housing, and the construction sector will also be a major driver of job creation.

Through 2022, the region will see 1.9% average annual job gains, compared with the national average of 1.2%. The housing recovery, combined with robust development in commercial real estate development and infrastructure, will boost average annual payroll growth in the construction sector by 5.4%, while professional and business services grow by 4.1% annually.

Nevada

Economy in 2018: Job growth in Nevada will continue at a robust pace, registering gains of 3.2% this year. The state's employment gains will be top in the nation 2018, outpacing Texas, Utah, Florida, and Idaho who round out the top five. Service sector gains will dominate hiring this year. Professional/business services, education/health services, and leisure/hospitality services will add 5.3%, 3.7%, and 2.0%, respectively, to total payrolls. Of the 43,300 new jobs that the state labor market will create this year, almost 22,000 will come from these three sectors alone. Construction employment will surge 8.6% this year, continuing a trend of outsized gains spurred by residential, commercial, and industrial development. The solid labor market gains will continue to put downward pressure on the unemployment rate which will recede to 4.3% by the end of the year.

Nevada's growth has been a bit different during the current expansion than it was during the early 2000s. Although resurgent housing and gaming sectors have been key pieces of the state's recovery, the state has seen growth in other areas that represent the beginnings of a diversification away from these sectors. A burgeoning high-tech hub in Las Vegas has created new growth in the information and business services sectors. The city of Reno in northern Nevada, decimated by the Great Recession, has found new life as a manufacturing, logistics, and data warehousing hub. This of course is anchored by Tesla's Gigafactory.
Economy through the Next Five Years:

Nevada took a huge hit during the Great Recession and the housing bust, but it has and will continue to experience strong growth in the coming years. The state finally recouped all its job losses in 2016 and has remained in growth mode. Although the influx of new residents will not return to its pace prior to the collapse, the state will nevertheless rank fifth in the US in terms of population growth over the next five years, at 1.4%. Strong population and service sector growth will drive employment gains, which will easily outpace the nation, increasing 2.5% on an average annual basis through 2022. This pace of payroll expansion will place Nevada first in the nation.

The state’s prominent service sector will play a key role in its recovery. Professional and business services will be one of the top growing sectors, adding 5.2% to payrolls, on average, each year. Strong population gains and an aging population will fuel demand for education and health services, and this sector will add jobs at a 1.8% annual pace. The all-important leisure and hospitality services segment will expand by 1.2%, a deceleration from recent trends. In fact, leisure/hospitality growth has trailed the total employment average since 2012 with the exception of 2014 when it matched it. This indicates a degree of diversity forming for the state economy even if leisure/hospitality remains a key component. Construction gains, meanwhile, will continue to be impressive, catapulting 8.4%.
Housing:
The residential real estate market in Nevada has been on a tear since emerging from the severe declines incurred during the epic 2007-2011 correction. After turning the corner in mid-2012, y/y home values have been appreciating at double-digit rates. According to the Federal Housing Finance Agency’s purchase-only home price index, the sale price of existing homes rose 12% y/y during the fourth quarter of 2017, continuing the streak of double digit gains. Despite the rapid gains, home values are still below their peak in 2006 (in nominal terms) at 88% of those levels. Nevada homes were certainly overvalued back then; so a return to those levels will naturally take an extended period of time but they are closing in. Foreclosure activity has grinded to a halt with just 1.4% of mortgages in foreclosure at the end of 2017 compared to 10% at the end of 2010.

Builders broke ground on 17,600 homes in 2017, close to the level seen in 2016 and the highest level since 2007, right before the housing market unraveled. Starts activity will not reach the levels seen during the housing bubble but continue to build momentum, a reassuring sign for underlying demand and the strength of the local economy. We expect new construction to continue to ramp up this year, with total starts hitting 20,000.

Las Vegas

Economy in 2018:
On the heels of 3.0% job growth in 2017, we forecast acceleration to 3.3% job growth in 2018. Strong gains in leisure and hospitality services (2.2% growth), education and health services (4.1%), and professional and business services (4.6%) will significantly boost the metro economy this year and represent the vast majority of gains. Professional and business services will show consistent payroll
additions and will be one of the city's fastest-growing sectors in the near and mid-term. Education and health, which is typically a consistent source of new jobs, will continue to perform well over the medium term. Ultimately, however, the Las Vegas economy will only go as far as the leisure and hospitality sector can take it. Representing 32% of total employment, sustained growth in leisure and hospitality is essential in Vegas. Fortunately, solid consumer confidence is good for tourism but hiring in leisure/hospitality has been slowing nonetheless and could be a limiting factor over the medium term. Fortunately, tremendous growth in construction hiring has helped to pick up the slack with growth expected in double digits gain this year (up 11%) following double digit growth in 2014, 2015, and 2017. Development is booming with several projects currently under way that have spurred strong need for workers, including the new Raiders National Football League (NFL) stadium and the massive Resorts World project. The factory sector has also done well as manufacturers see increasing benefits to locating operation in Nevada.

Economy through the Next Five Years:

Payroll growth in Las Vegas will slow in the coming years, yet remain at least twice as fast as the nation. Strong population growth combined with surging home values and construction and favorable consumer fundamentals means that the region will easily outperform the country over the next five years. Through 2022, Las Vegas will add to payrolls at a 2.6% average annual pace, well above the US pace of 1.2%. Construction will be a key driver during this time, climbing 9.5% per year. Business services will add 5.3% driven by strong gains in administrative and temporary staffing which is highly cyclical and thrives in these economic conditions. Strong population gains will drive 2.1% growth in education and health services. Leisure and hospitality will add 1.3% per year, well below the overall average as the state slowly diversifies its economic base away from gaming.
Housing:

Home price gains in Las Vegas were impressive, up 12.6% y/y during the fourth quarter of 2017 according to the Federal Housing Finance Agency’s purchase-only home price. The metro’s housing market has been recovering but it will take time before it fully rebounds—from its pre-recession peak of $326,000, the existing median home price plummeted 63% to $121,000 by the end of 2011. Fortunately, the streak of outsized home price gains has allowed the metro to gain some ground over the past few years. According to the purchase-only index values, prices are now 80% of where they were during the 2006 peak (in nominal values). Given how far prices fell and how bloated they were during the bubble years this is tangible improvement. While the real estate downturn was a major economic blow for many metros in this past recession, Las Vegas was at the forefront. Las Vegas is now at the forefront of the recovery with housing remaining a key economic driver over the near-term.

Forecast Summary

Economy in 2018:

The Reno-Sparks economy remained solid in 2017 but showed some indication of deceleration. Nonfarm payrolls expanded by 2.6% last year—extremely strong yet considerably slower than the 4.9% pace the prior year. It ended the year with a 4.2% unemployment rate, indicating that labor supply is getting tighter and employers may be having a more difficult time hiring. Labor shortages in the construction sector have been widely reported across the country, and Reno’s red-hot housing market and plethora of ongoing commercial and industrial projects have no doubt pushed local supply to its limits. The sector added 5.6% last year after double-digit gains in 2016. Manufacturing, anchored by rising employment at Tesla’s Gigafactory, rose 5.3%.
Payroll growth in 2018 will accelerate from last year, advancing 3.0%. Construction hiring will pick up after a softer 2017 with employment growing by 8.3% in 2018. T tightness in the construction labor market will remain an issue and keep that sector from getting back to double digits. Other key sectors this year include professional/business services, manufacturing, leisure/hospitality. Also, the metro’s burgeoning transportation and warehousing sector will continue to experience solid gains. The metro area is quickly becoming a hub for logistics and data centers due to its strategic geographic location.

Economy through the Next Five Years:

Reno’s long-term economic growth will be led by its services sectors. Leisure and hospitality services have been a major employment generator, but the metro is diversifying away from its traditional leisure/hospitality sector and will see strong growth elsewhere. We expect professional and business services to lead gains among service sectors, adding an average of 5.3% annually through 2022. The education and health services sector will see solid growth as it keeps up with a population that is progressively getting older, averaging 1.2% job gains annually. The manufacturing will do well over the medium-term with employment gains up 2.0% annually over the next five years thanks to especially strong growth from 2018-19. We expect the construction sector to continue its protracted recovery with payrolls surging 8.6% annually, on average.
Housing:

After taking a severe beating during the housing crisis, home prices in Reno, like the rest of the state, are rebounding. Indeed, home values have been appreciating at double-digit year-on-year (y/y) rates since the middle of 2012. According to data from the Federal Housing Finance Agency, prices climbed 12% y/y in the fourth quarter of 2017. Strong labor market growth, dwindling supplies of for-sale existing homes and limited new construction are pushing values up rapidly. Housing starts continued to climb higher in 2017, when nearly 3,900 new homes were constructed, up from 3,100 a year before. This year, we expect demand to quicken the pace of new homebuilding again to more than 4,100.

**LONG-TERM OUTLOOK**

Table 1 shows that we forecast employment growth in Washoe County to expand by an average rate of 2.1% between 2017 and 2022, with employment growth decelerating to 0.9% annually after 2027 as the construction boom tapers off, labor markets tighten, and aging demographics begin to weigh on job growth. The highest long-term employment growth will be seen in the service sectors. The personal income growth rate will also decelerate over the 25-year forecast horizon at 4.6% annually, although it could rise if the county is able to attract a larger share of higher-paying jobs to the region. Momentum related to current big-ticket investments could potentially attract additional investment down the road as other firms cluster in the region. Finally, we forecast that real gross county-level product will grow at an annual rate of 2.9% over the next five years, on par with Nevada’s real GSP growth during that time.

Table 2 presents a special population forecast prepared by IHS Markit Economics. Over the next five years, we forecast an annual population growth rate of 1.2%, which is a departure from the 2.2% annual growth rate recorded between 1990 and 2017. Over the longer term, we forecast that total population will also grow at an annual rate of 1.0% over the next 10 years, and be a shade lower (up 0.9%) over the
25-year period between 2017 and 2042. The fastest-growing age cohorts over the next 25 years will be the over 85 years old, 80 to 84 years old, 75 to 79 years old, and 70 to 74 years old cohorts. By contrast, annual population growth rates in the cohorts containing working age population between the ages of 25 and 55 will be much lower. The growing share of the population in the older cohorts is not just a local phenomenon but something that is also playing out nationally and does represent a downward pull on overall economic growth.

As shown in Table 2, over the 25-year forecast period, we forecast that Reno's annual household growth rate will be 1.0%, close to the population growth rate over the same period. However, between 2017 and 2022, the differential between the household and population growth rates will be greatest, with households growing at 1.5% during this period compared to annual population growth of 1.2%. This differential is due to the household size continuing to decrease following the Great Recession. An improving housing market will spur pent up demand for new units and in turn drive household growth as young adults move out of their parents’ house, roommates disband to get their own residence, and homelessness eases. Over the 25 year period, we forecast an average annual household growth rate of 1.0%, with the largest growth rates occurring in the 65 years and older cohorts.
Appendix C

Woods and Poole Background Data

Chapter 2. Technical Description of the Woods & Poole Economics, Inc.
2017 Regional Projections and Database

Introduction

The Woods & Poole Economics, Inc. database contains more than 900 economic and demographic variables for every county in the United States for every year from 1970 to 2050. This comprehensive database includes detailed population data by age, sex, and race; employment and earnings by major industry; personal income by source of income; retail sales by kind of business; and data on the number of households, their size, and their income. All of these variables are projected for each year through 2050. In total, there are over 200 million statistics in the regional database. The regional model that produces the projection component of this database was developed by Woods & Poole. The regional projection methods are revised somewhat year to year to reflect new computational techniques and new sources of regional economic and demographic information. Each year, a new projection is produced based on an updated historical database and revised assumptions.

The fact that the proprietary Woods & Poole economic and demographic projections rely on a very detailed database, makes them one of the most comprehensive county-level projections available. A description of some characteristics of the database and projection model is contained in this chapter.

Overview of the Projection Methods

The strength of Woods & Poole’s economic and demographic projections stems from the comprehensive historical county database and the integrated nature of the projection model. The projection for each county in the United States is done simultaneously so that changes in one county will affect growth or decline in other counties. For example, growth in employment and population in Houston will affect growth in other metropolitan areas, such as Cleveland. This reflects the flow of economic activity around the country as new industries emerge or relocate in growing areas and as people migrate, in part because of job opportunities. The county projections are developed within the framework of the United States projection made by Woods & Poole. The U.S. projection is the control total for the 2017 regional projections and is described in the “Overview of the 2017 Projections” chapter included in Woods & Poole publications.

The regional projection technique used by Woods & Poole — linking the counties together to capture regional flows and constraining the results to a previously determined United States total — avoids a common pitfall in regional projections. Regional projections are sometimes made for a city or county without regard for potential growth in surrounding areas or other areas in the country. Such projections may be simple extrapolations of recent historical trends and, as a result, may be too optimistic or pessimistic. If these county projections were added together, the total might differ considerably from any conceivable national forecast scenario; this is the result of each regional projection being generated independently without interactive procedures and without being integrated into a consistent national projection.

Woods & Poole Economics, Inc. is a small, independent corporation that specializes in long-term county economic and demographic projections. Woods & Poole’s database for every county in the U.S. contains projections through 2050 for more than 900 variables.
The methods used by Woods & Poole to generate the county projections proceed in four stages. First, forecasts to 2050 of total United States personal income, earnings by industry, employment by industry, population, inflation, and other variables are made. Second, the country is divided into 179 Economic Areas (EAs) as defined by the U.S. Department of Commerce, Bureau of Economic Analysis (BEA). The EAs are aggregates of contiguous counties that attempt to measure cohesive economic regions in the United States (a list of all EAs and their component counties can be found in Appendix 6 following this chapter); in the 2017 Woods & Poole model, EA definitions released by the BEA in May 2007 are used. For each EA, a projection is made for employment, using an “export-base” approach; in some cases the employment projections are adjusted to reflect the results of individual EA models or exogenous information and assumptions about the EA economy. The employment projections for each EA is then used to estimate earnings in each EA. The employment and earnings projections then become the principal explanatory variables used to estimate population and number of households in each EA.

The third stage is to project population by age, sex, and race for each EA on the basis of net migration rates projected from employment opportunities. For stages two and three, the U.S. projection is the control total for the EA projections. The fourth stage replicates stages two and three except that it is performed at the county level, using the EAs as the control total for the county projections.

The “Export-Base” Approach

The economic projection techniques used by Woods & Poole to generate the employment, earnings, and income estimates for each county in the United States generally follow a standard economic “export-base” approach. This relatively simple approach to regional employment projections is one that has been used by a number of researchers (see [5] and [9]). Although this approach has been criticized by several empirical studies (e.g., [8]), given the availability of regional data it remains one of the most feasible theoretical methodologies.

Certain industrial sectors at the regional level are considered “basic.” This means that these sectors produce output that is not consumed locally but is “exported” out of the region for national or international consumption. This assumption allows these sectors to be linked closely to the national economy, and hence follow national trends in productivity and output growth. Normally, the “basic” sectors are mining, agriculture, manufacturing, and the Federal government. In contrast, “non-basic” sectors are those such as retail trade, utilities, real estate, and construction, the output of which is usually consumed locally. The growth of the “non-basic” sectors depends largely on the growth of the “basic” sectors that form the basis of the region’s economy.

Intuitively, this approach has great appeal and there are numerous examples that seem to support the “export-base” theory. Automobile production in Detroit, for example, is obviously much more sensitive to national and international price and demand for transportation equipment than to local demand. In Texas, oil and natural gas exploration and...
production are tied closely to the worldwide demand and supply of petroleum resources and not tied primarily to energy consumption in Texas.

Although the theory is appealing, some shortcomings do exist in the "export-base" approach. For example, some "basic" commodities produced locally are consumed locally. Producers of durable equipment used in other manufacturing processes are often affected not by the national demand for their product but by the regional demand. Machine tool makers that supply the local automobile industry in Detroit will prosper to the extent Detroit's automobile producers prosper. In Houston, the strength of the local oil industry will affect the demand and production of equipment for oil and natural gas production and exploration. In both of these instances, some durable manufacturing industries exist to serve local, not national, markets.

However, despite the shortcomings, the availability of relatively clean data for sub-national geographic areas makes the "export-base" approach very useful. The analytical framework for projections using the "export-base" approach entails estimating either demand equations or calculating historical growth rate differentials for output by sector. The principal explanatory variable, or the comparative data series for growth rate differentials, is the national demand for the output of that sector. Employment-by-sector data are often used as a surrogate variable since county output-by-sector data are not available; employment-by-sector data are used by Woods & Poole. Earnings projections are then obtained by using earnings-per-employee data either estimated as part of the model or imposed exogenously on the system. The complementary relationship could also be estimated, i.e., using an earnings forecast to derive employment based on earnings-per-employee data; this procedure has been used previously in some Woods & Poole regional models.

A modification of the "export-base" approach is used by Woods & Poole to account for regional variants to normal "basic"/"non-basic" industry definitions. Some "non-basic" sectors can be more appropriately modeled as "basic" sectors in certain regional economies. The finance and insurance sector or wholesale trade sector in New York City, for example, and the accommodation and food services sector in Las Vegas, are cases in which traditionally "non-basic" sectors are really "basic." New York is a worldwide financial and trade center and thus "exports" these services outside of the region; Las Vegas, as a vacation and entertainment center, similarly "exports" the output of its accommodation and food services sector to other parts of the country. Activity in these sectors, in these specific geographic areas, is therefore linked more closely to the performance of these same sectors in the surrounding regions and the nation as a whole than to the other "basic" industries in the region.

A list of Economic Areas that have traditionally "non-basic" sectors modeled as "basic" sectors is presented in Table 1. Areas with "non-basic" sectors modeled as "basic" are those areas with a proportion of "non-basic" sector employment relative to total employment greater than 1.5 standard deviations above the national mean for a specific sector. With the exception of two sectors that are always considered "non-basic," construction and state and local government, all "non-basic" sectors are evaluated for each EA using this method (see [5]).
The remainder of the Woods and Poole technical documentation is available upon request.
Appendix D

The Nevada State Demographer’s projections are developed using the Regional Economic Models, Incorporated (REMI) model through 2036.

The REMI model is a comprehensive model that encompasses a wide range of demographic and economic activity. It relates a region or set of regions to each other and the nation as whole. It also comes with differing levels of industrial detail. The model is used by the Nevada Commission on Economic Development, the Nevada Department of Administration, and the University of Nevada, Las Vegas. The model used in producing these projections is a 17 region model with a breakdown into 23 industrial sectors. Documentation about the model can be found at http://www.remi.com/support/documents.shtml.

The overall linkages of the REMI model are shown in Figure 1.
The REMI model comes with a baseline forecast, what has come to be referred to as an out of the box projection (see Appendix pages). The user can do things such as update employment for all sectors and by specific sectors through what are called policy variables. For the most part, those kinds of changes were made to the model in producing the projections. One area of concern in looking at the model was the performance of the Population and Labor Supply Block which is illustrated in Figure 2.

**Figure 2:**


### LIMITATIONS TO THE PROJECTIONS

REMI has a number of strengths. The model is under constant research and has been available for over 25 years. It has been examined and reviewed through peer-reviewed articles. The User Guide and other information is available to anyone with a computer, that is much of the detail of their methodology is publicly available. One of the major limitations with the model is that there is currently limited historic data from which it is built. This is because of the change from the Standard Industrial Classification (SIC) to the North American Industrial Classification System (NAICS) in 2001. Limited history limits the amount of information that a model can be constructed from for portraying the area that is being modeled. Another limit is that Nevada has a number of small counties as well as areas with limited numbers of employees or employers in various economic sectors. This leads to missing information through data suppression which REMI and this office has to then estimate values to substitute for that missing information.

Also, REMI is built on federal data including the annual estimates that are done by the Census Bureau. So any projections done within the model have to be re-based off of Nevada’s generated estimates.
Appendix E  TMWA Forecast Information

Memorandum

TO:
FROM:  Shawn Stoddard, Ph.D. Senior Resource Economist
DATE:  January 11, 2018
SUBJ:  TPEM Series No. 8: Washoe County Population Forecast 2017 to 2060

Findings
• Washoe County population projection is updated with 2016 population estimates.
• 2016 population is 448,316 which is 2,172 persons less than projected in the water resource plan.
• Washoe County population from 1950 to 2016 continues to be well modeled by a logistic curve.
• TMWA’s projections are compared with State Demographer’s draft 2017 projection.
• TMWA’s population projections for 2017 to 2060:

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>Year</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>454,465</td>
<td>2039</td>
<td>546,513</td>
</tr>
<tr>
<td>2018</td>
<td>460,434</td>
<td>2040</td>
<td>549,005</td>
</tr>
<tr>
<td>2019</td>
<td>466,223</td>
<td>2041</td>
<td>551,380</td>
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<tr>
<td>2020</td>
<td>471,832</td>
<td>2042</td>
<td>553,644</td>
</tr>
<tr>
<td>2021</td>
<td>477,261</td>
<td>2043</td>
<td>555,802</td>
</tr>
<tr>
<td>2022</td>
<td>482,509</td>
<td>2044</td>
<td>557,858</td>
</tr>
<tr>
<td>2023</td>
<td>487,578</td>
<td>2045</td>
<td>559,815</td>
</tr>
<tr>
<td>2024</td>
<td>492,469</td>
<td>2046</td>
<td>561,678</td>
</tr>
<tr>
<td>2025</td>
<td>497,185</td>
<td>2047</td>
<td>563,451</td>
</tr>
<tr>
<td>2026</td>
<td>501,727</td>
<td>2048</td>
<td>565,138</td>
</tr>
<tr>
<td>2027</td>
<td>506,098</td>
<td>2049</td>
<td>566,742</td>
</tr>
<tr>
<td>2028</td>
<td>510,301</td>
<td>2050</td>
<td>568,266</td>
</tr>
<tr>
<td>2029</td>
<td>514,339</td>
<td>2051</td>
<td>569,715</td>
</tr>
<tr>
<td>2030</td>
<td>518,216</td>
<td>2052</td>
<td>571,092</td>
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<tr>
<td>2031</td>
<td>521,936</td>
<td>2053</td>
<td>572,400</td>
</tr>
<tr>
<td>2032</td>
<td>525,502</td>
<td>2054</td>
<td>573,642</td>
</tr>
<tr>
<td>2033</td>
<td>528,918</td>
<td>2055</td>
<td>574,821</td>
</tr>
<tr>
<td>2034</td>
<td>532,189</td>
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</tr>
<tr>
<td>2035</td>
<td>535,319</td>
<td>2057</td>
<td>577,002</td>
</tr>
<tr>
<td>2036</td>
<td>538,313</td>
<td>2058</td>
<td>578,010</td>
</tr>
<tr>
<td>2037</td>
<td>541,173</td>
<td>2059</td>
<td>578,966</td>
</tr>
<tr>
<td>2038</td>
<td>543,906</td>
<td>2060</td>
<td>579,872</td>
</tr>
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</table>
Discussion

TPEM Series No. 4 describes prior population forecasting models and their results. This analysis is an update to prior studies, provides a review of population trend, and compares the most recent consensus and State Demographer’s (“SD’s”) projections.

Logistic Curve Model

The logistic curve model for Washoe County population was developed in TPEM No. 1 is defined as:

$$Pop_t = \alpha / (1 + \beta_1 e^{-\beta_2 t})$$

Where $t$ is time index (1950 = 1), $Pop_t$ is population in time $t$, $\alpha$ is population ceiling, $\beta_1$ and $\beta_2$ are shape parameters.

Using population values from 1950 to 2016 the model was estimated as:

$$Pop_t = 596,041 / (1 + 11,760.85 e^{-0.045560 t})$$

Where $t$ is time in years starting at $t = 1$ for 1950. The $R^2 = 0.9995$ shows that this model is a very good fit to the historic data. Figure 1 plots the results of this model. This model estimates the long-run population ceiling of 596,041 persons estimated to occur after 2100 with a 95% confidence interval between 570,534 to 621,547 persons.

![TMWA's Washoe County Population Model](image)

Figure 1: Washoe County Population Model 1950 to 2016.
Figure 1, shows a comparison of TMWA's population model with historic population values. It can be seen over time that population closely follows the model with periods when the population trends above and below the model. The recent population levels are below the model and trending back towards the model. This requires that the population projections be calibrated in such a way that the first year of the projection is equal to observed population while holding the projected population ceiling constant. This is done by estimating the following model iteratively until the calibration parameter is less than 1.

\[
P_{t} + \text{Calibrate} = \frac{596,041}{[1 + \beta t \cdot e^{-\beta t}]}
\]

Calibrate is the difference between the predicted model population and the actual population in 2016. As the model is solved and the calibration term added to the population, the model converges to a shape that forces the model trend to pass through the observed 2016 population.

Figure 2 shows the population model, the calibrated model, the State Demographer's 2017 draft projection and the 2016 Consensus Forecast.

Figure 2: Comparisons of local population models.
Figure 3: Long run population projection.

Figure 3 shows how the population is expected to level out at about 596,000 persons. This slowing of growth is expected to start occurring around year 2060. Comparing TMWA’s projection with the SD’s projection show how both projections are now projecting very similar population levels.

TMWA and SD 2017 draft projections are on similar paths with a potential for the SD projection to diverge downwards from the long run trend starting about the year 2030. Figure 4 shows the 95% confidence level for the TMWA model. In the long run, the population of Washoe County has a 95% probability of being between 570,534 and 621,547 persons.
Figure 4: 95% Confidence Boundaries on TMWA 2017 Population Model.
Figure 5: Population Projection 2017 to 2050.
Appendix F

Calibration of Global Insight Employment Forecast

Jeremy M. Smith, GIS Coordinator - TMRPA

Background: The Global Insight Forecast is a key input to the Consensus Forecast (CF) as it provides a second projection of job growth by sector when combined with data sourced from Woods and Poole. Local sources (e.g. NV State Demographer) have only recently begun to publish sector-level employment forecasts and these will likely be of great benefit in subsequent versions of the CF. Nevertheless, for this rendition of the CF we have opted to follow historic protocols. Historically, these two outside sources of employment information have been more closely aligned, however in this delivery from Global Insight the disparities with Woods and Poole and other 3rd party employment data sources (e.g. Infogroup business points) were quite wide (c. 80k jobs).

After discussion with the NV State Demographer and staff from Global Insight it was determined that the base year (2018) value for number of employees was principally determined using data from the U.S. Bureau of Labor and Statistics Quarterly Census of Employment and Wages (BLS). Job counts done by BLS tally only covered employees (i.e. jobs where unemployment insurance is paid) which leads to underestimation of total employment by omitting many job types that are not required to pay into unemployment. Some notable examples include sole proprietorships and part-time positions. Since this CF will be used to inform traffic demand modeling and other regional planning efforts, it is imperative that we have an accounting of all jobs. Both Woods and Poole and the NV State Demographer retrieve base data from the Bureau of Economic Analysis (BEA). The BEA uses a more inclusive methodology, not limited to covered employment, for tallying jobs by sector and is therefore more indicative of total jobs in the region.

Since the Consensus Forecast approach is basically an average of totals, we determined that averaging a subset of jobs (i.e. Global Insight based on BLS) with a forecast based on all potential jobs would provide a spurious output average. Thus, we concluded that a calibration process was required to factor up the base year estimation from Global Insight to account for the disparity.

Methodology: In order to calibrate the Global Insight forecast we examined employee counts from both the Bureau of Labor and Statistics (BLS) and Bureau of Economic Analysis (BEA) by sector for 2016, the most recently available common year of reporting between the 2 sources (Table 1). Data listing employee counts by 2-digit (or groups of 2-digit) NAICS sectors were acquired from both sources and compared by first calculating an absolute difference and then by calculating the ratio of BLS jobs reported to those reported by BEA. The BEA counts were consistently higher and up to 14 times greater than employee counts reported by BLS (e.g. NAICS 21 – Mining, quarrying, and oil and gas extraction).

In order to align the value ranges for Global Insight and Woods and Poole data, we created a calibrated value of 307,981 for year 2016 by applying a factor of 1.44 to the total employment reported by Global Insight. The factor of 1.44 represents the ratio of total BEA employees to total BLS employees reported in 2016. We applied the 1.44 factor to the annual projection values from Global Insight across the 20-year CF projection horizon. We then averaged the calibrated Global Insight employment values with the employment values reported by Woods and Poole for each year until 2038 to derive the yearly employment values to be reported in the 2018-2038 Consensus Forecast document. Since each year was factored by the same value we expect very little change to the...
employment growth rate forecasted by Global Insight and therefore it maintains its validity in the consensus forecasting approach.

Table 1. Comparison of employment counts by industry sector from the Bureau of Labor and Statistics (BLS) and Bureau of Economic Analysis (BEA) for Washoe County, NV in 2016.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NAICS 11 Agriculture, forestry, fishing and hunting</td>
<td>315</td>
<td>800</td>
<td>485</td>
<td>2.54</td>
</tr>
<tr>
<td>NAICS 21 Mining, quarrying, and oil and gas extraction</td>
<td>137</td>
<td>1,995</td>
<td>1,858</td>
<td>14.56</td>
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<td>NAICS 22 Utilities</td>
<td>735</td>
<td>470</td>
<td>-265</td>
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<tr>
<td>NAICS 23 Construction</td>
<td>13,932</td>
<td>16,888</td>
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<tr>
<td>NAICS 31-33 Manufacturing</td>
<td>12,709</td>
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<td>1,115</td>
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<tr>
<td>NAICS 42 Wholesale trade</td>
<td>9,039</td>
<td>10,779</td>
<td>1,740</td>
<td>1.19</td>
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<tr>
<td>NAICS 44-45 Retail trade</td>
<td>22,978</td>
<td>27,903</td>
<td>4,925</td>
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<td>NAICS 48-49 Transportation and warehousing</td>
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<td>15,883</td>
<td>1,200</td>
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<tr>
<td>NAICS 51 Information</td>
<td>2,081</td>
<td>2,942</td>
<td>861</td>
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<td>5,874</td>
<td>14,256</td>
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<td>NAICS 53 Real estate and rental and leasing</td>
<td>3,980</td>
<td>20,228</td>
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<tr>
<td>NAICS 54 Professional and technical services</td>
<td>10,619</td>
<td>19,280</td>
<td>8,661</td>
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<tr>
<td>NAICS 55 Management of companies and enterprises</td>
<td>2,995</td>
<td>3,813</td>
<td>818</td>
<td>1.27</td>
</tr>
<tr>
<td>NAICS 56 Administrative and waste services</td>
<td>16,307</td>
<td>20,007</td>
<td>3,700</td>
<td>1.23</td>
</tr>
<tr>
<td>NAICS 61 Educational services</td>
<td>2,172</td>
<td>3,643</td>
<td>1,471</td>
<td>1.68</td>
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<tr>
<td>NAICS 62 Health care and social assistance</td>
<td>24,211</td>
<td>26,376</td>
<td>2,165</td>
<td>1.09</td>
</tr>
<tr>
<td>NAICS 71 Arts, entertainment, and recreation</td>
<td>5,444</td>
<td>8,543</td>
<td>3,099</td>
<td>1.57</td>
</tr>
<tr>
<td>NAICS 72 Accommodation and food services</td>
<td>31,369</td>
<td>33,043</td>
<td>1,674</td>
<td>1.05</td>
</tr>
<tr>
<td>NAICS 81 Other services, except public administration</td>
<td>5,464</td>
<td>13,358</td>
<td>7,894</td>
<td>2.44</td>
</tr>
<tr>
<td>NAICS 92 Public administration</td>
<td>8,719</td>
<td>24,314</td>
<td>15,595</td>
<td>2.79</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>193,763</strong></td>
<td><strong>278,345</strong></td>
<td><strong>84,582</strong></td>
<td><strong>1.44</strong></td>
</tr>
</tbody>
</table>

2. [http://www.bea.gov/Itable](http://www.bea.gov/Itable)

For more information please contact Jeremy M. Smith at Truckee Meadows Regional Planning Agency (jsmith@tmpra.org, 775-321-8390)