

Step Two: Conduct the Economic Opportunities Analysis—Advanced Approach

This chapter describes a level of analysis in addition to the Basic Approach that meets the requirements of Goal 9.

This Advanced approach requires more detailed data and analysis as well as geographic information systems (GIS). Primary research on employment densities, development trends and other factors included a 20-year demand forecast improve the forecast data.

Advanced Approach—Demand

This section describes how to calculate long-term (20 years) and short-term (1-5 years) needs, followed by steps to aggregate and disaggregate demand. For example, an aggregate forecast is an estimate of the total amount of industrial land needed in a jurisdiction during a 20-year planning period. A disaggregated forecast may start with the aggregated, long-term forecast as a baseline or control and divide it further by subarea, industrial sector, parcel size and time period, such as 1-5 years or 5-10 years. Table 7, continued on the next page, shows a sample disaggregation of employment demand.

Table 7Sample Disaggregation								
Employment Sectors (Non-farm payroll)	Projected Jobs* 2002-2022	Capture Industrial Rate Jobs		Supportable Gross FI. Area Req. (sf)**	Supportable Acreage (gross)***			
Manufacturing		40%						
Durable Goods	180	40%	72	72,000	24			
Lumber & Wood Products	(60)	40%	(24)	(24,000)				

Table 7Sample Disaggregation									
Other Durable Goods	240	40%	96	96,000	31				
Non-Durable Goods	(180)	40%	(72)	(72,000)					
Food & Associated Products	(240)	40%	(96)	(96,000)					
Other Non- Durable Goods	60	40%	24	24,000	8				
Construction & Mining	(480)								
Transportation & Utilities	(920)	40%	(368)	(368,000)					
Wholesale Trade	360	40%	144	144,000	47				
Government	840	20%	67	67,200	22				
TOTAL	5,390		(157)	(156,800)	132				

*Does not reflect jobs/land for schools.

** Assumes 1,000 gross square feet of floor area per employee.

*** Assumes 30% of site devoted to public roads, utilities and open space.

As noted previously, many variables can be considered to estimate the growth and kind of industrial and other employment activity that will require developable vacant land.

Long-Term Demand Analysis

Forecasted employment growth can be translated into demand after ascertaining the possible types of companies expected to expand or locate in the planning area and the employees per acre. The resulting estimate can be refined further by applying assumptions about re-use of vacant buildings, redevelopment of built sites and floor-to-area ratios in multi-story buildings. The resulting supportable acreage is the amount of building or land area likely to be needed or supported by the projected job growth. The analysis of site requirements should consider size, shape, soil, transportation access, services and other characteristics.

This data can be entered into a spreadsheet with worksheets supporting each set of input and, if appropriate, alternative geographies (e.g., neighborhoods within a city, cities within a county, counties within a region). A recommended methodology follows:

Long-Term Demand Task Checklist.

- Demand Task 1: Establish baseline employment level and historic growth trends
- **Demand Task 2:** Forecast employment growth
- **Demand Task 3:** Group industries by type of land use
- Demand Task 4: Identify employment growth that does not require additional land
- Demand Task 5: Apply assumptions to convert employment growth to land demand
- Demand Task 6: Adjust net acres to total developable acres
- **Demand Task 7:** Adjust for vacancy rate
- **Demand Task 8:** Disaggregate the total demand

Demand Task 1. Establish baseline employment level and historic growth trends.

The Oregon Employment Department publishes employment data for the state and individual counties by sector and industry, showing the number of reporting units or establishments, monthly employment, average annual employment, quarterly payroll and annual payroll. As this information is derived from unemployment insurance data provided by individual firms, it includes only employees covered by the state's unemployment insurance program, or "covered employment." Generally, people not included are the self-employed, seasonal agricultural workers and some railroad employees. To maintain confidentiality, information about employment sectors or industries with one or a few firms is combined.

Though employment data for cities is not published regularly, municipalities may request confidential data for planning purposes. This information reveals monthly employment and quarterly payroll for individual firms, along with the firm name, street address, state, zip code and industry code.

For research purposes and to establish historic employment trends, it is best to request data for the last five to ten years, as well as the current time period. A jurisdiction may also ask for information for its competitive market region-- a group of counties that provides area-wide land, goods, services and jobs. Converting this raw data to a format that establishes a baseline employment level describes historic employment trends and involves these steps:

Task 1.1. Sort data by geographic identifier, or "geocode" for individual firms.

After obtaining information about the "universe" of firms or establishments in a larger planning area and regional trends, informed decisions about local capture rates can be made that take into account the competitive advantages of the local area.

Correlate employment data to a physical location or subarea. If geocoding individual firms is too time-consuming and costly, the data can be approximated by sorting addresses by zip codes. They also should be divided by accepted industry classifications, such as SIC or NAICS.

Task 1.2. Develop summary data by industry.

Task 1A results in a data set that represents firms in the planning area by industry. Information about average annual employment, total payroll and the number of firms by industry can then be calculated. Useful trend indicators include employment and payroll growth, average firm size and payroll per employee.

Data for industries in which there are fewer than three firms, or in which one firm represents more than 80% of employment in that industry, are confidential. Jurisdictions may use this information for planning purposes but cannot otherwise make it public.

Task1.3. Adjust data to reflect total employment.

In light of the growing importance of self-employed workers and small home based employers, it is optional to determine total employment in the job forecast rather than "covered employment." The latter data from the Oregon Employment Department includes only employees covered by unemployment insurance. Data from the U.S. Bureau of Economic Analysis (BEA) on the total number of proprietors for covered employment by industry and by county also is available. Estimates of the ratio of covered to non-covered employment range from 5 – 15%.

Adjustments for agricultural workers and railroad employees are not necessary as they generate little if any demand for Industrial or commercial land.

Data sources:

- Oregon Employment Department ES 202 data (www.qualityinfo.org)
- ✓ Bureau of Economic Analysis employment by county (www.bea.doc.gov)
- ✓ Local employers, chambers of commerce
- Regional employment economists

Demand Task 2. Forecast employment growth.

The State of Oregon Office of Economic Analysis publishes longterm forecasts of total employment growth by county. As job forecasts are based generally on population ratios, cities need to consider their unique development issues, opportunities and constraints in developing their own employment forecasts. Forecasting the average annual growth rate expected for each industry should be based on economic trends and indicators for the planning area, such as:

- Historical growth rate of local industries
- Expansion plans of local firms and industries

Data about the following also is needed:

- Average annual growth rate for all industries, as indicated by the state's long-term forecast of employment growth by county
- Average annual growth rate for industries indicated in the Oregon Employment Department's 10-year forecast of employment by industry for Workforce Planning Areas
- National and state long-term employment trends by industry
- An Assessment of community economic development potential; This is required for Goal 9 analyses and should include consideration of the planning jurisdiction's location relative to markets, availability of transportation facilities, public services, labor market conditions, raw material, energy availability and other factors

Nearly every industry and firm has year-to-year fluctuations in employment. Jurisdictions should focus on long-term trends to determine their likely average annual growth rate. These average annual growth rates (AAGR) can be applied to the baseline level of employment established in Task 1 to calculate the employment level and employment growth by industry.

Data sources:

- ✓ Oregon Employment Department ES 202 data and 10-year regional growth forecast by industry and occupation
- ✓ Bureau of Economic Analysis employment by county
- ✓ Local firms

Demand Task 3. Group industries by type of land use.

To forecast demand for non-residential land, employment growth by industry should be combined, based on their employment

Table 8Sample of Grouping Industries by Land Use Type									
Warehouse/Distribution General Industrial Tech/Flex									
Construction and Mining		75%	25%						
Manufacturing		75%	25%						
TCU									
Trucking and Warehousing	100%								
Water Transportation	100%								
Air Transportation	100%								
Communications		50%	50%						
Electricity, Gas, Sanitation		50%	50%						
Wholesale	90%	10%							
Services									
Computer, Data Processing			100%						
Auto Repair, Services, Parking		100%							
Miscellaneous Repair		75%	25%						

densitiesanddevelopmenttypes.Table8showsthreecommonlandusetypesandtheircorrespondingtypicalindustries:

Commercial: retail, administrative and professional activities such as finance, insurance, real estate, legal, accounting, information technology and medical services. May also include food service, recreation and tourism facilities.

Industrial:
manufacturing, assembly,
fabrication, processing,

Source: Hammer Siler George Associates

storage, logistics, warehousing, distribution, research and development, business headquarters.

Institutional: public and private health care facilities, jails, schools and government facilities.

By grouping employment sectors into major categories, the sizes of buildings and land area required to accommodate future job growth can be determined.

Data sources:

- ✓ Local employment forecasts by industry
- ✓ Previous analysis

Demand Task 4. Identify employment growth that does not require additional land.

The next step is to identify employment growth that does not require additional land. Three types of employment growth will not need additional non-residential land:

Expansion by local firms. Anticipated employment growth of firms that own sufficient built space or land to accommodate expansion should be subtracted from the forecasted employment growth by land use type. They also should not be included in the inventory of buildable land, as it is not available to other firms. In many areas, this is a primary source of economic growth.

Growth that can be accommodated in vacant buildings and/or underutilized sites. As there is little empirical data on the share of employment growth that can be accommodated in vacant or redeveloped buildings, a general rule-of-thumb is 10% to 15%. An analysis of improvement-to-land-value ratio can help identify a better estimate of redevelopable land. This can also be validated by visual confirmation or "windshield surveys." It also should not be included in the inventory of buildable land. Industrial and other employment jobs within residential or mixeduse zones. Planning areas that allow a mixture of employment and residential land uses, such as Mixed-Use Commercial and Mixed-Use Employment Districts tend to require medium- to highdensity housing co-existing with retail, office and some light industrial uses. This may entail GIS-based analysis of employment sectors by standard industrial classifications (SIC) for a particular zone district (using ES202 data) or field research to verify the numbers of dwellings, types of employers and number of employees. Table 9 provides a sample mixed-use zoning analysis of jobs and dwellings.

Table 9 Sample Mixed-Use Zoning Analysis of Jobs and Dwellings							
Mixed Use Zone Town Center – Jobs	Range (FAR/Acre)*	Assumed Range (FAR/Acre)*	Assumed Distribution of Land Use	Assumed Distribution of Acres (Net Buildable)	Estimated Floor Area (SF)	Assumed Floor Area SF Per Job	Estimated New Jobs
Retail Use	0.20-0.30	0.25	70%	17.1	186,000	550	338
Office Use	0.35-0.50	0.50	20%	4.9	106,000	350	304
Civic/Other Use	0.20-0.40	040	10%	2.4	42,000	750	56
Total			100%	24.4	334,000		698

Mixed-Use Zone Town Center – Dwellings	Estimated Floor Area (SF)**	Assumed Average SF/Dwelling	Estimated Dwelling Units		
 Retail Floor Area	186,000				
 Upper-Level Housing	61,380	950	65		

* FAR = ratio of building floor area to total site land area.

** Retail floor area estimate derived from above calculation on retail use. Source: Otak, Inc. A similar analysis can determine the extent to which there are residential/other uses in industrial and commercial zone districts. Generally, this has been found to be between zero and 25% of the land area. In mixed-use zones, an allocation between zero and 10% of total industrial and other employment jobs is standard. This should be deducted from the overall commercial/industrial job forecasts to determine the net demand for land.

Data sources:

- Interviews with local industries
- ✓ ES202 data analysis of job sectors by land use zone
- ✓ Information on home-based occupations
- ✓ Chambers of commerce
- ✓ Business directories

<u>Demand Task 5.</u> Apply assumptions to convert employment growth to land demand by land use type.

These two methods can be used to convert employment growth to land demand by land use type.

Option A. Employees per acre

The first option entails assumptions about employees per acre can be based on empirical or other measures of land demand. Typically, each acre can accommodate approximately 10 to 15 employees for general commercial and office-park industrial use, and about 20 for offices in non-metropolitan downtowns and suburban settings. High-rise office buildings in metropolitan downtowns are as dense as 100 employees per acre.

Jurisdictions can develop their own measures by matching confidential employment data for individual firms to parcel size by using assessment and taxation information. The resulting employees per acre can be averaged by industry or land use type, with the average applied to the employment forecast to estimate land demand in acres. Some sampling to confirm the estimate, through interviews, assessment data on building footprints and field checks, is optional.

Measures of employees per acre vary widely, even among firms in the same industry. In all cases, these assumptions should reflect local conditions and expected trends.

Option B. Building square feet per employee and floor-area ratios (FAR's)

Applying assumptions of building square feet per employee (SFE) to the employment forecast results in an estimate of total building space needed to accommodate forecasted employment growth. This estimate can be translated to net acres of land by applying assumptions of building FARs. These assumptions can be based on similar studies elsewhere or local analyses.

For SFE, there is general consensus in empirical studies that a reasonable range for office use is between 300 and 500 square feet; retail can be the same or slightly higher. Industrial and warehousing may reach as high as 600 to 1,000. FARs average around 0.2 to 0.4 for suburban areas, varying by land use and building type.

To develop measures of SFE, a local jurisdiction should match confidential employment data for individual firms to building size available in assessment and taxation data. This information also can be used to calculate a FAR for each firm. The resulting measures can be averaged by industry or land use type.

As noted previously, both estimates can vary widely among firms in the same industry. The assumptions applied to the employment forecast should be adjusted to reflect local conditions and expected trends.

²⁻³⁰ Industrial and Other Employment Lands Analysis--Advanced Guidebook 2005

The employees-per-acre estimates should be about the same as the SFE/FAR calculations. Using the example above, office employment at 500 SFE and an FAR of 0.3 yields a density of about 21 employees per acre.

Data sources:

- ✓ General employment density studies
- ✓ Local employment density study

Demand Task 6. Adjust net acres to total developable acres.

Step 5 results in an estimate of demand in net acres. This does not include land area for streets, rights-of-way for powerlines or pipelines, wetlands, riparian space and similar uses. This can vary substantially and should reflect local conditions.

A net-to-gross factor can range from zero to 25% of total land area. Jurisdictions where streets and public facilities in nonresidential areas are already developed need not make as large an adjustment to net acres, while those with large blocks of nonresidential land that will need such infrastructure should use an adjustment of about 25%. This will increase net acres (total demand less employment growth that does not generate new land demand) to total developable acres of demand.

Data sources:

✓ Analysis of local non-residential net-to-gross ratio

Demand Task 7. Adjust for vacancy rate.

Real estate markets operate efficiently if there is more supply than immediate demand. With respect to land, most real estate economists accept an available supply two to five times greater than the immediate demand. A 20-year supply of land in an urban growth boundary should result in adequate choice in the shortterm. There are exceptions, such as, for example, if a few large parcels are held by a single owner who does not plan to sell them in the immediate future can impact available supply.

Vacancy rates also apply to built space. As they tend to be cyclical, the assumption should reflect a long-term average and provide a range of choices. For efficient market operation, a minimum vacancy rate for built space is between 5% and 15%. The estimate of total acres of demand should be increased by this percentage as the market often requires more options than the employment estimates seem to require.

Data sources:

✓ Interviews with local realtors

Demand Task 8. Disaggregate the total demand.

The total demand for industrial and other employment land uses that results at the end of Task 7 is for 20 years. Task 8 may be undertaken if further estimates of subcategories, such as heavy industrial/high-tech; short-term/long-term; geographical areas; or parcel size, are needed. Unless the total demand has been developed (steps 1-7) by adding up disaggregated demand estimates, these estimates should subdivide the aggregate (total) land need into components.

AS part of their Goal 9 analysis, cities and counties should identify the site requirements of firms that may expand or locate in the planning area. As an important component, parcel size can be determined by using the same employment and land use data as employed to estimate total land demand. An estimate of demand by parcel size can be compared to supply by parcel size to indicate any land deficiencies that should be addressed. A parcel may include more than one tax lot if they are contiguous and/or can be combined under one ownership. The most direct way to estimate this total demand is to match employment data with parcel size from assessment and taxation information. The results should be manually reviewed for each firm, as some parcels may be larger than needed to support one firm and more than one employer may be located on the same parcel.

An alternate method is to infer parcel size from firm size (employees per firm). This can be ascertained directly from ES-202 employment data. The number of employees per firm can be converted to parcel size per firm, based on the employment density assumptions (employees per acre or building square feet per employee and FAR) for the estimated total land need described previously.

With either method, the resulting data on firm and parcel size should be summarized into a distribution of average parcel size by industries or land use types. For example, firms can be divided into groups of employees—1 to 5; 6 to 30; 31 to 100; etc. Within each group for each industry or land use type, the total number of acres of land (derived from geocoding employment data or estimating parcel size from employment density assumptions) can be divided by the number of companies in that size category to calculate the average parcel size.

Data sources:

- ✓ ES-202 data geocoded to parcels
- Random sample of developed parcels

Short-Term Demand Analysis

This analysis should be consistent with the data and results of the local economic strategy and the Basic land analysis methods, as discussed in the Basic approach. The results can be used to determine market conditions and short-term economic growth potential and demand. Market conditions can be categorized as follows:

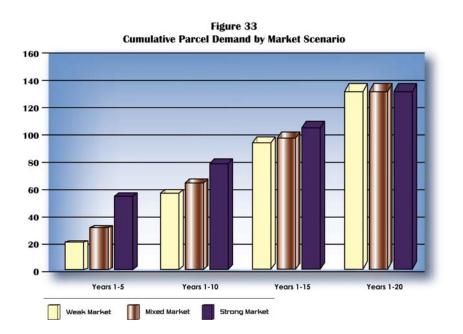
- Strong Market—favorable regional and local economic growth pressure; few sites/buildings exist in market area; local economic objectives and strategy stress capitalizing on near-term development opportunities.
- Mixed Market—favorable regional and local growth pressure; local economic objectives and strategy support growth; existing or planned local supply of land/buildings appears adequate to meet short-term demand.
- Weak Market—low to moderate regional and local economic growth pressure; local economic objectives and strategy do not support significant growth; local supply of land/buildings appears adequate to meet short-term demand.

Following the assessment of 20-year growth potential, the jurisdiction can quantify industrial and other employment land demand over the short-term (1-5 years) by following these steps:

Short-Term Demand Task 1. Interpolate long-term parcel demand (from Task 8) into short-term demand.

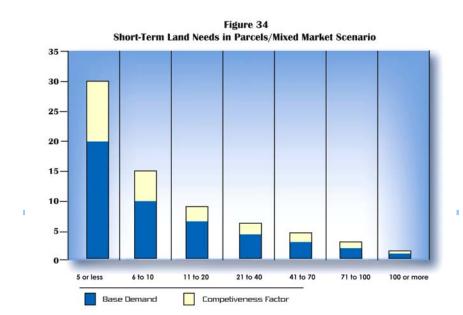
Use long-term demand data from Task 8 to determine short-term demand by dividing the number of years by the total parcel demand. Adjust according to the jurisdiction's market scenario.

Figure 33 illustrates the three market scenarios. All assume the same long-term parcel demand, with varying levels of short-term demand that reflect local conditions.



Short-Term Demand Task 2. Adjust short-term parcel demand upward to reflect a land market factor.

This reflects the need to provide a competitive inventory of sites to help meet employer preferences about parcel size, location and cost. Depending upon the local economic development strategy objectives, these factors can range from as much as 50% to 200% of baseline demand forecasts. Figure 34 illustrates the effect of a 50% competitive market factor on parcel demand.



Short-Term Demand Task 3. Analyze supply constraints, adjusting short-term demand potential accordingly.

As noted, short-term supply constraints are important influences on short-term demand. An assessment of ownership and environmental and infrastructure needs should focus on potential sites that may accommodate the short-term demand. For example, if during step two it was determined that four sites of over 70 acres may be needed in the short-term, but the development constraints analysis reveals that only one site is actually available, the jurisdiction may decide to focus on other short-term opportunities such as supply of 5- to 20-acre sites.

Short-Term Demand Task 4. Identify policies to facilitate desired development.

A jurisdiction's ability to realize its short-term development potential can be augmented by supporting land use and funding policies such as:

- Flexible land use zoning ordinances that appeal to a variety of users
- Staff assistance to developers in the preparation of site master plans and/or environmental permits; engineering and architectural design drawings and specifications
- Proactive marketing and promotional efforts
- Requests for development proposals or expressions of interest from developers for specific sites
- Public funding or other financing that can provide needed infrastructure or be used to help leverage desired private investment
- Public assemblage of strategic parcels of land
- Commercial/industrial business parks or speculative buildings

Advanced Approach: Determining Supply

Long-Term Land Supply

The steps in this analysis build on the Basic Approach, introducing GIS and other data collection techniques. They will help a jurisdiction calculate:

- Gross vacant acres by plan designation, including fully vacant and partially vacant tax lots
- Gross buildable vacant acres by plan designation, subtracting unbuildable acres from total acres
- Net buildable acres by plan designation, subtracting land for future public facilities from gross buildable vacant acres
- Total net buildable acres by plan designation, adding redevelopable acres to net buildable acres

Supply Task Checklist.

- Assemble databases.
- Categorize land. Classify land into several mutually exclusive categories.
- Identify development constraints. Acknowledgment that not all vacant land is buildable and may be constrained by natural features, zoning, public facilities and other factors.
- Calculate net buildable land. Data may be organized by any of the attributes the jurisdiction wishes. GIS provides information that allows classification of each tax lot as either developed, partially developed, or vacant. Tax lots that are considered developed are re-assessed in a subsequent step to determine their redevelopment potential.

- Verify analysis. This generally includes review through aerial photos, orthophotos and field research to identify potential problems that cannot be ascertained by other means.
- Analyze land by type.

This Advanced Approach is aided by use of GIS data to develop a summary of land supply that can be cross-referenced. It relies on information such as land use and zoning, parcel boundaries and physical features that can be manipulated at the tax lot level.

There are many ways that "vacant land" and "buildable land" can be defined.

Tax lot boundaries often include developed and vacant land on the same parcel (e.g., one house on a three-acre lot). Thus, on individual tax lots, vacant land that is not constrained (buildable) may be either totally vacant with no significant improvements or partially vacant with some improvements. It also may be described as underutilized and redevelopable.

Redevelopable land is not vacant but can support some of the new demand identified previously. A common guide to determine whether a parcel is redevelopable is if the value of improvement on the land is less than the land value alone. This is also called have a land-to-improvement value ratio. If the ratio is greater than 1:1, the lot may be considered redevelopable. Another way to assess the likelihood of redevelopment is to compare the parcels' improvement value to surrounding parcels. If the improvement value is significantly lower than similarly designated surrounding parcels, it may be redevelopable.

Infill is not considered a type of vacant land development, but a condition of a tax lot relative it's to surroundings. If nearby tax lots

²⁻³⁸ Industrial and Other Employment Lands Analysis--Advanced Guidebook 2005

are primarily developed, an isolated buildable tax lot (totally or partially vacant) is considered an infill tax lot.

In summary, over the long term, two types of land can support new development: buildable vacant land and redevelopable land.

Supply Task 1. Assemble databases.

Obtain as much data about the land supply as possible. This should include:

- ArcView shape files showing parcel boundaries for all tax lots within the UGB, as well as any other relevant GIS data layers such as plan designations and physical features
- Records for all tax lots within the UGB in a digital format that can be imported into a corresponding spreadsheet or database applications
- Recent aerial photographs, preferably digital orthophotographs
- Maps of any significant natural resources or other constrained lands, preferably in ArcView format
- Copies of plan designation and zoning maps
- Assessor's index and quarter section maps for all areas within the UGB
- Comprehensive plan designations

It is not unusual for cities to have incomplete data when beginning a land supply inventory.

Data sources: Listed above

Supply Task 2. Classify tax lots.

The following describe land types:

Vacant. Land not currently containing permanent buildings or improvements.

Partially vacant or underutilized. Parcels with some development; vacant portions of parcels large enough to support development.

Constrained. Parts or entire parcels may be considered constrained or unable to support development. Typical constraints include:

- Wetlands
- Riparian areas and shorelines
- Steep slopes
- Geologic hazards
- Critical habitat areas
- Tsunami inundation zones
- Areas unserviceable over the 20-year planning period such as airport runways and expansion zones
- Floodplains and floodways

Constrained parcels or portions of parcels should be subtracted from total vacant land to obtain a buildable land estimate. This estimate should be further divided into totally vacant and partially vacant, based on parcel boundaries and existing development. Document this information in a format compatible with ArcView, such as a Microsoft Excel database or Access spreadsheet.

Redevelopable. Parcels with developed structures likely to be demolished. A portion of parcels that meet criteria for redevelopment potential should be assumed to redevelop during

²⁻⁴⁰ Industrial and Other Employment Lands Analysis--Advanced Guidebook 2005

the planning period. An estimate may also have been addressed during the demand analysis. If so, do not double count redevelopbale land in the supply section.

Developed. All land that is not vacant, partially vacant or redevelopable.

Data sources:

- ✓ Existing GIS parcel data
- ✓ Assessor's information
- ✓ Fieldwork

Supply Task 3. Identify development constraints.

Existing studies and reports, research, fieldwork and/or aerial photo interpretation are sources for this gathering information on development constraints. Additional information about types of constraints follows.

Wetlands

Jurisdictions with a current local wetlands inventory (LWI) should use that as a reference. If only a partial inventory is available, combine with other sources such as the National Wetland Inventory (NWI).

If there is no local wetland inventory, use NWI data as a base. If it seems to underestimate the amount of significant wetlands, undertake research, such as an analysis of soil types or field verification. Public review and comment on wetlands maps can be helpful particularly if a local LWI has not been completed. See also DSL Guide to Wetland Inventories (www.oregonstatelands.us/lwi.htm).

Floodplains

Most jurisdictions rely on a flood insurance rate map (FIRM) from the Federal Emergency Management Agency (FEMA) to identify floodplain boundaries. Federal and local regulations do not prohibit development in floodplains. Many allow development if it is elevated one foot above base flood level and proper local/federal permits are obtained. Jurisdictions that allow development that meets this standard should not deduct floodplains from their buildable land supply inventory.

Drainageways and Riparian Areas

Jurisdictions that have riparian setback ordinances should include any unbuildable areas in their constraint analyses. If the riparian areas are mapped, an overlay analysis with the GIS database is optimal. If they are not, review local ordinances and determine an appropriate method. Setbacks may be estimated by using a buffer tool in the GIS database.

Parks and Open Space

Public and private parks and open space areas should be considered unbuildable and excluded from the buildable lands inventory.

Hazardous Land: Slide Areas, Steep Slopes, and Earthquake Faults

These areas should be identified in the Goal 7, Natural Hazards element of the local comprehensive plan. With a contour layer, jurisdictions can use a digital elevation model to identify areas that could be constrained by slope. In the absence of local hazard ordinances, jurisdictions can remove all lands with more than 25% slope from the buildable lands base as an approximation. Industrial sites with more than 10% slope may be considered constrained.

²⁻⁴² Industrial and Other Employment Lands Analysis--Advanced Guidebook 2005

Brownfields

These are properties where expansion or redevelopment may be hindered by actual or perceived environmental contamination (ORS 285A.185). Examples are former mill sites, gas stations, scrap yards and dry cleaners. Federal funding is available to assess and clean up brownfields and manage potential liability. After environmental and liability issues are mitigated, brownfields can be classified as vacant or redevelopable.

Service Constraints

These are most frequently due to lack of availability of water, or sewer or transportation to the site. Areas not scheduled for water, sewer or transportation service during the next 20 years can be identified by a review of local water, sewer and transportation master plans.

Institutional Uses

Governmental, public and non-profit facilities such as museums and schools are generally considered unavailable for development and zoned institutional rather than commercial or industrial. However, as they may be significant employers, they should be part of the employment analysis. Their long-range plans also should be considered.

Data sources:

- ✓ GIS parcel data
- ✓ Wetlands inventories
- ✓ FEMA FIRM maps
- ✓ Water and sewer master plans
- Park and school plans
- ✓ Local natural hazards inventory

Supply Task 4. Estimate total buildable land supply by land classification.

To ensure the accuracy of the conclusions before the final analysis is conducted, jurisdictions should verify buildable land data through aerial photos and field visits. Large jurisdictions may choose standard sampling techniques to test accuracy of the analysis.

Calculate gross buildable acres. Divide the estimated total buildable land supply into classifications. Begin by subtracting constrained acres from total vacant acres—preferably at the tax lot level. This analysis is most easily done by using GIS. It should result in a tabular database that can be summarized by various attributes, such as plan designation and zoning, and facilitates further disaggregated analysis that may be needed.

Jurisdictions have two options when addressing redevelopment potential: either deduct employment from the demand side of the calculation or include redevelopable land on the supply side. To avoid double-counting, only one approach should be used.

A supply-side analysis can help identify tax lots with redevelopment potential—those with developed structures with some probability of being demolished and replaced. Many studies use improvement-to-land-value ratios to estimate this.

Convert gross acres to net acres. A gross acre is a vacant acre of land before it has had a portion of the property dedicated for public rights-of-way, private streets, or public utility easements. For example, a standard assumption is that about 20% of land in a residential subdivision is used for streets and utilities: thus, a gross vacant acre will yield only about 35,000 sq. ft. (80% of a full acre) for lots. At five dwelling units per gross acre, the average lot size is about 7,000 square feet. A jurisdiction can calculate the precise percentage for reducing gross to net residential acres by

analyzing subdivision permits over the last five years. Environmental constraints described in Supply Task 3 cab reduce developable acreage even further.

One way to check assumptions is to randomly select developed industrial and other employment parcels and calculate the amount of land available for development that is used for streets, utility easements, and other public purposes.

Table 10 provides a sample calculation of converting gross to net acres.

Table 10 Sample Non-Residential Lands Data Worksheet										
Tax Lot#	Total Acreage	<u>Minus</u> Developed acreage	<u>Equals</u> Gross vacant acreage	<u>Minus</u> Constrained acres	<u>Equals</u> Gross buildable vacant acres	<u>Minus</u> Acres for public facilities (25%)	<u>Equals</u> Net buildable vacant acres	<u>Plus</u> Redevelo pable acres [*]	<u>Equals</u> Total net buildable acres	
Commercia	Commercial Plan Designation									
1202	10.0	0.0	10.0	1.1	8.9	2.2	6.7	-	6.7	
1400	5.0	1.0	4.0	0.0	4.0	1.0	3.0	-	3.0	
1506	8.0	8.0	0.0	0.0	0.0	0.0	0.0	4.0	4.0	
Subtotals	Subtotals							4.0	13.7	
Industrial Pla	Industrial Plan Designation									
2000	20.0	0.0	20.0	2.0	18.0	4.5	13.5	-	13.5	
4500	3.0	3.0	0.0	0.0	0.0	0.0	0.0	3.0	3.0	
Subtotals	Subtotals						13.5	3.0	16.5	
Total Net Bu	otal Net Buildable Acres							7.0	30.2	

Source: Adapted from the HB 2709 Workbook

^a Note: Rredevelopment may also be addressed on the demand side of the analysis

Summarize buildable land by classification and plan designation.

At a minimum, jurisdictions should develop buildable lands inventory maps and summary tables displaying this information. Zoning and land classifications may also be shown.

Data sources:

- ✓ GIS parcel data
- ✓ Assessors' information
- ✓ Field verification

Supply Task 5. Estimate employment holding capacity.

The final step in this analysis is to estimate how much employment can be accommodated on the buildable land, know as its "holding capacity." This requires density assumptions expressed in employees-per-acre multiplied by the estimate of total buildable acres.

The derivation of the employees-per-acre estimates also is described in this chapter under Demand Task 5. Generally, 14-20 employees per acre can be expected on commercial land; 8-12 employees per acre on industrial land and 6-10 on institutionally zoned land. Estimates aside, there is considerable variation, even within specific industries. In addition, any given industry can include many different occupations, each with a different employment density. It is always advisable to check the current employee-per-acre ratio as a comparison to the rule-of-thumb estimates.

Divide the number of employees forecast for each land use type by the employment density assumption (expressed in employees per acre) to estimate the number of acres needed for each land use type.

Data sources:

- ✓ General employment density information
- ✓ Local employment density data

Short-Term Land Supply

Jurisdictions may have a 20-year supply of industrial and other employment land and still not have many sites ready for development. This situation may occur if:

- Vacant, buildable, and serviceable sites are owned by a few property owners who are not ready to develop
- There are significant physical, institutional, or cost constraints before necessary public services (primarily roads, water, and sewer) can be supplied

Short-TermSupply Task 1. Identify short-term land supply.

In the buildable lands inventory, identify the number of sites and total acreage by land type ready for immediate development. The local public facilities plan should define the time schedule for providing services to developable sites.

Data sources:

- ✓ Local public facilities plans
- Interviews with public works director, utility districts
- ✓ Interviews with local landowners, developers and realtors

Advanced Approach—Comparing Land Demand and Supply (Need)

In the Basic approach, the result of the land demand analysis is compared to the total buildable land supply to determine whether the jurisdiction has a 20-year supply of buildable land. An analysis of short-term supply is also required.

Jurisdictions can begin a more detailed comparison of demand and supply by reviewing the site requirements of firms and conducting a detailed comparison of local sites. At a minimum, this can occur at the plan designation level. More detailed analyses may be by building type (e.g., research and development, warehouse/distribution, general industrial, Class A office, retail, etc)., site requirements (size and other characteristics), or industry.

Reconciliation Task 1. Compare short-term demand and supply by firm need.

The supply analysis requires information about land by tax lot or parcel size and plan designation. This may then be compared to the identified site requirements of firms. For example, a jurisdiction that desires to attract a chip manufacturer but does not have any parcels larger than 20 acres cannot meet this need as such industries are likely to require sites of 50 to 100 acres.

This detailed comparison should include all the physical aspects including:

- Land use buffers
- Flat sites
- Parcel configuration and parking
- Soil type
- Building density
- Air transportation
- **S** Fiber optics and telephone
- Potable water
- Power requirements
- Roadways
- Transit
- Pedestrian and bicycle facilities
- Air and water quality requirements

A final issue for consideration is the location of lands designated for industrial and other employment uses. For example, a review will be needed if all the buildable commercial lands are in one quadrant, a significant part of the buildable residential lands in another, and the jurisdiction has growth policies that encourage mixed-use development in both.

Data sources:

- ✓ Maps of buildable lands
- ✓ GIS database
- ✓ Development goals and policies
- Interviews with existing and potential employees