



STAFF REPORT

TO: Clark County Planning Commission
FROM: Oliver Orjiako, Director
PREPARED BY: Jose Alvarez
DATE: November 1, 2015
SUBJECT: Planning Assumptions

BACKGROUND:

County housing and employment growth targets stem from population forecast released by the State Office of Financial Management (OFM). OFM provides a range of low, medium and high population projections and deems the medium, the most likely scenario. However, the final decision rests with the county legislative authority, as do all other planning assumptions.

PLANNING ASSUMPTIONS:

The following planning assumptions are used to determine the supply of land needed to accommodate the 20-year population projection: Persons per household; Urban/Rural Split; Infrastructure; and Market Factor. These demand side factors are used to estimate the amount of land needed to accommodate the 20 year population projection. The Vacant Buildable Lands Model (VBLM) below provides the capacity estimate.

A land use calculator was created that includes planning assumptions as directed by the Board, as of April 2015. The calculator enables “what if” scenarios by allowing changes to the assumptions, highlighted in red. A change in the assumption(s) would show the effect on the amount of land needed and whether there is sufficient capacity (supply) in our existing inventory. A negative number indicates a shortage.

Urban/Rural split is a planning assumption used to determine the percentage of growth that is anticipated in the urban and rural areas respectively. The 1994 plan used an 80/20 split. The 2004 and 2007 plan updates both used a 90/10 split. The attached table indicates the total annual population of the county and rural areas from 1994 to 2014. The rural percent has declined from 15.47% to 13.87% in the 20 year period. This decline is captured in the 11.18% percent of total growth going to the rural area in the same time interval. From 2007 to 2014 the percent of rural growth has been 10.42% of total county growth.

Cluster remainder lots have not been excluded from the rural capacity estimates because there is no systemic way of identifying them and excluding them. We are working on identifying those subdivisions that are in the Tidemark system since 1999 and providing parcel level data to GIS

to digitize. Those cluster developments prior to 1994 will require identification through the data we have on microfilm.

The Habitat 40.440B(3) and the Wetlands 40.450.010(B)(4)(c) ordinances each have a reasonable use provision which states: "This chapter shall not be used to deny or reduce the number of lots of a proposed rural land division allowed under applicable zoning density."

VACANT BUILDABLE LANDS MODEL (VBLM)

In 1992, Clark County began the Vacant Lands analysis to determine the potential capacity of urban growth areas to accommodate projected growth for the next 20 years to the year 2012. County staff met with interested parties from the development and environmental community to collectively examine criteria to be used to compute the supply of land available for development within each urban growth boundary. From the process, a methodology was developed using Clark County's Geographic Information Systems (GIS) as the primary data source. The methodology for the VBLM has been refined over time as development data is analyzed to justify modifications to model assumptions.

Since 1992, the county has used a more informal process to estimate the capacity of lots in the rural area. The rural lot estimate has been used to determine whether there is sufficient capacity (lots) to accommodate the projected rural growth. The methodology used to estimate capacity in the 2015-2035 planning horizon is attached as are the capacity estimates. The methodology is primarily based on the number of parcels that are vacant or could be subdivided under existing zoning regulations. Many parcels in rural areas are smaller than the minimum lot size, because they were created long ago, before current zoning was in place.

DRAFT

Estimating Potential Rural Housing and Employment Clark County, Washington

The Rural Vacant Buildable Land Model (Rural VBLM) estimates the number of houses and jobs on lands outside of the Urban Growth Area. Rural lands and rural development behave differently than urban development. These differences are significant enough to require a new VBLM classification method. This document describes the Rural VBLM.

The Rural VBLM works very similar to the Urban VBLM. The primary input is a proposed land use layer. This layer is used to classify lands into the 3 VBLM land use categories: Residential, Commercial, or Industrial. The Assessor's database is used to classify the parcels into VBLM classifications: Vacant, Built, Underutilized, Excluded) based on the property type, ownership, and size. The Residential Rural VBLM differs most substantially from the Urban VBLM.

Rural VBLM Land Uses

Land use designations from the comprehensive plan or proposed zoning plan are categorized into the three land use models.

- Residential – rural, rural center residential, urban reserve, agriculture, and forest land use designations
- Commercial – commercial land use designations
- Industrial – industrial land use designations

Residential VBLM Classifications

Property with a proposed land use of Residential are subdivided into the following VBLM categories based on information from the Assessor's database.

- Built
 - Parcel has existing housing units
 - Parcel is too small to be further divided based on minimum lot size requirements
- Vacant
 - No existing housing units
 - May contain outbuildings
- Underutilized
 - Parcel has existing housing units
 - Parcel is large enough to be further divided based on minimum lot size requirements
- Excluded
 - Forest zoned lands in the Current Use program (Timber or Designated Forest Land (DFL))
 - Surface mining overlay area
 - Water Areas
 - Private street or Right of Way
 - Transportation or utilities
 - Private park or recreation areas
 - Assessed as a zero value property
 - Size is less than 1 acre
 - Tax exempt
- Not a Residential land use

Residential Planning Assumptions:

- Housing capacity calculation:
 - One housing unit per undersized vacant parcel
 - Conforming vacant and underutilized parcels
 - Housing unit capacity is calculated by dividing the parcel acres by the minimum lot size.
 - For dividable parcels remainder lots are considered buildable if they are within 10% of the minimum lot size.
- Population Capacity calculation
 - 2.66 persons per housing unit

Employment

Most of the rural area is designated rural residential but there are pockets of commercial and industrial areas available for future employment. Commercial and Industrial lands use the same Rural VBLM classifications. The only difference is in the number of employees per acre

Commercial and Industrial VBLM Classifications

- Vacant
 - Building value less than \$67,500
- Underutilized
 - Parcels with existing buildings that have a building value per acre less than \$50,000
- Excluded
 - Surface mining overlay area
 - Water
 - Private street
 - Right of Way
 - Utilities
 - A Private park or recreation areas
 - Assessed as a zero value property
 - Tax exempt
- Built
 - Building value of \$67,500 or more
- Not Commercial or industrial

Employment Planning Assumptions:

- Vacant and underutilized lands receive the same number of employees per acre.
 - No reductions for constrained areas or infrastructure
 - Commercial employment
 - 20 employees per acre
 - Industrial employment
 - 1 employee per acre

1995 to 2014 Population Estimates for the Rural Area and Countywide

UGA	Total	Rural	Annual		Rural		% Population	
			Change	% Rural	Percent Change	Growth in Rural Area	Growth 1995-2014	
1995	279,522	43,254		15.47				
1996	293,182	44,882	1,628	15.31	3.76	11.9%	Total 167,263	Rural 18,694
1997	305,287	46,409	1,527	15.20	3.40	12.6%		11.18%
1998	319,233	48,104	1,695	15.07	3.65	12.2%		
1999	330,800	49,429	1,325	14.94	2.75	11.5%	Growth 1995-2004	
2000	346,435	51,182	1,753	14.77	3.55	11.2%	Total	Rural
2001	354,870	52,002	820	14.65	1.60	9.7%	105,191	11,615
2002	369,360	53,548	1,546	14.50	2.97	10.7%		11.04%
2003	375,394	54,146	598	14.42	1.12	9.9%		
2004	384,713	54,869	723	14.26	1.33	7.8%	Growth 2004-2014	
2005	395,780	56,009	1,140	14.15	2.08	10.3%	Total	Rural
2006	406,124	57,551	1,542	14.17	2.75	14.9%	62,072	7,079
2007	414,743	58,608	1,057	14.13	1.84	12.3%		11.40%
2008	419,483	59,042	434	14.07	0.74	9.2%		
2009	424,406	59,623	581	14.05	0.98	11.8%	Growth 2007-2014	
2010	427,327	59,858	235	14.01	0.39	8.0%	Total	Rural
2011	432,109	60,544	686	14.01	1.15	14.4%	32,042	3,339
2012	435,048	60,845	300	13.99	0.50	10.2%		10.42%
2013	443,277	61,489	645	13.87	1.06	7.8%		
2014	446,785	61,948	459	13.87	0.75	13.1%		
Rural Average Annual								
Exponential Growth Rate 1995 to								
2014						1.89		

Note: All estimates are based on the current urban growth area boundaries

Housing unit estimates are derived from the Assessor's database based on residential year built values

County Population Estimates are based on housing unit estimates from the Assessor's database and 2010 Census persons per household numbers
Estimates are for December 31st of each year.

ry block

BASE ASSUMPTIONS	
2015 Total Population	448,845
2035 Total Population	577,431
Total Population Growth	128,586
Rural Allocation	
Rural Split	10%
Rural Population Growth	12,859
Persons per household	2.66
Rural lots needed	4,834
Market Factor	0%
Rural lots + Market Factor	4,834
Rural Supply	
Rural lot capacity	7,661
Surplus/Deficit	2,827
URBAN ALLOCATION (Based on 75%/25% housing split)	
Urban Split	90%
Urban Population Growth	115,727
Persons per household	2.66
DEMAND	
Households	43,507
Net Acres Needed	6,071
Infrastructure	27.7%
Net Acres + INF	8,397
Market Factor	15%
Net Acres + INF+MF	9,657
SUPPLY	
VBLM Acres (z2014)	10,992
Surplus/Deficit	1,335
EMPLOYMENT ALLOCATION	
2015 Non-Farm Employment	141,300
2035 Non-Farm Employment	232,500
Jobs/Household Ratio	1.1
Total Job Growth	91,200
COMMERCIAL ALLOCATION	
79% Employment*	64,648

Employees per Acre	20
Net Acres needed	3,232
Infrastructure	25.0%
Net Acres + INF	4,310
Market Factor	15%
Net Acres + INF+MF	4,956
SUPPLY	
VBLM Acres (z2014)	3,486
Surplus/Deficit	-1,470
INDUSTRIAL ALLOCATION	
21% Employment	19,152
Employees per Acre	9
Net Acres needed	2,128
Infrastructure	25.0%
Net Acres + INF	2,837
Market Factor	15%
Net Acres + INF+MF	3,263
SUPPLY	
VBLM Acres (z2014)	5,029
Surplus/Deficit	1,766

* The employment number was reduced by 7,400. Those are jobs expected in Education and Government. Land owned by Schools is considered exempt by the VBLM and so no employment is attributed to that land. In addition the infrastructure deduction assumes a portion would go toward schools.

Clark County

2016 Comprehensive Growth Management Plan Update



CHECKING IN ON OUR FUTURE

Planning Assumption Choices

~~An Evidence Based Proposal~~ An Evidence Based Proposal by Councilor David Madore

11/3/2015

This document focuses primarily on the rural components of the Comp Plan, particularly Alternative 1 and Alternative 4. The proposal contrasts choice A with choice B and provides the factual basis for each. Table 1 provides the assumptions that define the methods for calculating the capacity for rural parcels to accommodate population growth. Table 2 provides the general planning assumptions for population growth, accommodate that growth, GMA considerations, and logical conclusions. The Reference Section provides relevant evidence, the historical basis, and supporting calculations for the two tables. The purpose of this document is to present decision makers with the compelling need to revise the original draft assumptions with more accurate, appropriate, realistic, and evidence based foundations and to apply the insight gained from staff, cities, citizens, the GIS database, and actual historical records.

022578

Table 1: Rural Vacant Buildable Lands Model (VBLM) Assumptions

Ref	A (DSEIS?)	B (Proposed New?)
1	Remainder lots of already developed cluster developments with permanent covenants prohibiting further development shall be counted as rural parcels that will develop.	Parcels that cannot reasonably be expected to develop should not be counted as likely to develop. Those include remainder lots of already developed cluster developments that are prohibited from further development. <u>No concrete data is available to support findings regarding the number of remainder lots. Cluster remainder lots have not been excluded from the rural capacity estimates because there is no systemic way of identifying them and excluding them. We are working on identifying those subdivisions that are in the Tidemark system since 1999 and providing parcel level data to GIS to digitize. Those cluster developments prior to 1994 will require identification through the data we have on microfilm.</u>
2	Parcels located in areas far from any infrastructure with continuous long term commercial forestry operations shall be counted as rural parcels that will develop. <u>Parcels meeting this criterion were excluded from the number of developable lots in the DSEIS. Nothing in CCC would prohibit development, and their owners may be relying upon the developability of those lands. Those parcels should have been included in the calculations.</u>	Parcels located in areas far from any infrastructure with continuous long term commercial forestry operations likely to continue should not be counted as likely to develop.
3	Rural parcels including 100% of environmentally constrained areas that lack the necessary area for septic systems and well clearances shall be counted as rural parcels that will develop. <u>This was not considered under the DSEIS.</u>	Rural parcels that have less than 1 acre of environmentally unconstrained land necessary for septic systems and well clearances should not be counted as likely to develop. <u>The Habitat Ordinance, CCC 40.440.020.B.(3), and the Wetlands Ordinance, CCC 40.450.010.(B).(4.(c)), ordinances each have a reasonable use provision which states: "This chapter shall not be used to deny or reduce the number of lots of a proposed rural land division allowed under applicable zoning density." New advanced septic technologies allow for systems where lots not previously considered feasible are now developable.</u>

Formatted: Body Text Indent 3

4	The adopted "Never to Convert" deductions used by the VBLM inside the Urban Growth Boundaries shall be omitted outside the Urban Growth Boundaries. All built and all vacant rural parcels shall be counted as rural parcels that will develop.	The adopted VBLM used for urban areas assumes that a percentage of properties that have an existing residence will likely not divide further. That same 30% "Never to Convert" assumption should apply to already built rural parcels as well. The adopted VBLM used for urban areas assumes that a percentage of vacant properties will likely not divide further. That same 10% "Never to Convert" assumption should apply to vacant rural parcels as well. This would be a BOCC policy decision.
5	Lots that are up to 10% smaller than the minimum lot size should be considered as conforming lots and counted as likely to develop as provided by current county code.	Same
6	All nonconforming parcels with <u>at least</u> 1 acre shall be counted as rural parcels that will develop.	10% of <u>(legal?)</u> nonconforming parcels with at least 1 acre of unconstrained area will likely develop at the same rate indicated by historical records. No concrete data is available to support these findings. This would be a BOCC policy decision.
7	The 15% Market Factor used for urban parcels to provide some margin for the law of supply and demand to satisfy the GMA affordable housing goal inside the UGB shall not apply outside the UGB. The market factor is an addition to the land needed in an urban growth area to accommodate 20-year growth projections, because of assumed fluctuating demand for that area. WAC 365-196-310(4)(b)(ii)(F). Market factor is a tool used to size the UGA and does not directly impact the number of lots under study. The market factor is not used to satisfy the affordable housing goals.	The same 15% Market Factor used for urban parcels to provide some margin for the law of supply and demand to satisfy the GMA affordable housing goal inside the UGB should apply outside the UGB as well. The market factor is not used to satisfy the affordable housing goals. It is used to size an area, not to determine the number of lots in the area.
8	A 27.7% infrastructure deduction is use for urban parcels. But because rural parcels are larger, the rural infrastructure deduction is assumed to be small. No deduction shall be used for rural parcels for any infrastructure such as roads, storm water, parks, schools, fire stations, conservation areas, lakes, streams, protected buffers, Etc.	Same, although a small percentage could reasonably be considered. An infrastructure deduction in the rural area would be unsupported because infrastructure needs do not reduce the number of available lots there, given code allowances for inclusion of land associated with roads and private stormwater facilities.

Table 2: Planning Assumptions

Planning Assumption	A	B
1	The 20 year urban population is forecasted to increase by 116,609.	Same $577,431 - 448,845 * .9 = 115,727$ (urban) <u>12,858 (rural)</u>
2	The actual historical urban/rural split has consistently been 86/14. But a 90/10 split shall be used instead (with no identified basis) to lower the rural population growth forecast to only 12,957 persons. <u>The urban/rural split means the allocation of the population growth rate, not the allocation of the population itself, between the urban and rural areas. The population itself may have been split 86%/14% over the period from 1994 to 2014, but that is not the same as the population growth rate split, which was 89%/11% during that period.</u>	The actual historical urban/rural split that has consistently been 86/14 should be used as the factual basis to forecast a realistic rural population growth of 16,325 persons. <u>Urban/Rural split is a planning assumption used to determine the percentage of growth that is anticipated in the urban and rural areas respectively. The 1994 plan used an 80/20 split. The 2004 and 2007 plan updates both used a 90/10 split. The attached table indicates the total annual population of the county and rural areas from 1994 to 2014. The rural percent has declined from 15.47% to 13.87% in the 20 year period. This decline is captured in the 11.18% percent of total growth going to the rural area in the same time interval. From 2007 to 2014 the percent of rural growth has been 10.42% of total county growth.</u> <u>The urban/rural split is based on the future growth, not the population for a particular year.</u>
3	The annual county-wide population growth rate is forecasted to be 1.25%. <u>This is an error.</u> Increasing from 447,865 in 2015 to 577,431 in 2035 is a total increase of 129,566 persons which is 1.279% per year. <u>448,845 is the estimated population for the 2015 base year. GIS and Planning use natural log versus Average Annual Compound Growth rate to calculate growth rate. What is the derivation of the 1.279%?</u>	The county-wide population with the 86/14 split is forecasted to increase from 447,865 in 2015 to 580,799 in 2035 for a total increase of 132,934 persons which is 1.308% per year. (0.029% higher than A). 580,799 is 0.58% higher than 577,431. <u>Growth rate of 1.308%; what is the derivation of this growth rate?</u>
4	The above <u>unrealistic</u> assumptions assert that Alternative 1 can accommodate 18,814 new persons which is 45% too high in the rural areas. (18,814 / 12,957)	The above updated assumptions show that Alternative 1 can only accommodate 6,190 new persons which is 38% too low. Thus Alternative 1 is not viable since it cannot comply with the GMA requirement to provide for the forecasted growth. (6,190 / 16,325) <u>The urban/rural split is based on the future growth, not the population for a particular year.</u>

5	The above unrealistic assumptions assert that Alternative 4 can accommodate 32,987 new persons which is 155% too high and therefore stated by the SDEIS to have too much impact. (32,987 / 12,957) ?	The above assumptions assert that Alternative 4 can accommodate 17,657 new persons which is 8% higher than needed. Thus Alternative 4 is the appropriate alternative that satisfies the GMA requirement to provide for the forecasted growth. (17,657 / 16,325) ?
6	The Alternative 4 map without mitigation revisions does not preserve large parcels near the UGBs for future employment, removes 20 acre AG zoning, and is said by the SDEIS to change the rural character. ?	The Alternative 4 updated map includes mitigation that increases the variety of parcels, preserves large parcels near the UGBs for future employment, and better preserves the rural character by including 20 acre AG minimum lot sizes. ?
7	Cluster options are not necessarily included in any Alternative and therefore may not be available to preserve open space or large areas of habitat. Clustering is currently allowed by code in the Rural zones. Code changes that would govern clustering should be adopted, consistent with GMA, after a preferred alternative is selected.	Rural cluster options are integrated into Alternative 4 for all rural zones to preserve open space and to better provide for large areas of habitat. Residential Ccluster development in the agriculturale areas would need to comply with be created on land not suitable for agriculture. (RCW 36.70A.177.)
8	Alternative-1 should be readopted even though it defines 60% of existing R parcels as nonconforming, 70% of existing AG parcels as nonconforming, and 80% of existing FR parcels as nonconforming. This is not in t The DSEIS does not recommend the selection of any alternative. The numbers cited are not a legal problem, but rather it is a describe ption of the rural landscape.	The updated Alternative-4 definition and map should be adopted to correct the mismatch between Alternative 1 and the actual ground truth, to respect predominant lots sizes, and to best accommodate the forecasted population. Some of the issues include the following: Legal lots, spot zoning, low-density rural sprawl, protection of resource lands, rural character, capital facilities needed to accommodate growth, and water supply.

Reference Section – the factual basis for assumptions

The following table documents the actual urban / rural split for the last 20 years:

Year	County-wide Population	Rural Population	Percent Rural Population	Urban / Rural Split	Percent of Population Growth in Rural Area
1995	279,522	43,254	15.5	84/16	na
1996	293,182	44,882	15.3	85/15	11.9
1997	305,287	46,409	15.2	85/15	12.6
1998	319,233	48,104	15.1	85/15	12.2
1999	330,800	49,429	14.9	85/15	11.5
2000	346,435	51,182	14.8	85/15	11.2
2001	354,870	52,002	14.7	85/15	9.7
2002	369,360	53,548	14.5	85/15	10.7
2003	375,394	54,146	14.4	86/14	9.9
2004	384,713	54,869	14.3	86/14	7.8
2005	395,780	56,009	14.2	86/14	10.3
2006	406,124	57,551	14.2	86/14	14.9
2007	414,743	58,608	14.1	86/14	12.3
2008	419,483	59,042	14.1	86/14	9.2
2009	424,406	59,623	14.0	86/14	11.8
2010	427,327	59,858	14.0	86/14	8.0
2011	432,109	60,544	14.0	86/14	14.3
2012	435,048	60,845	14.0	86/14	10.2
2013	443,277	61,489	13.9	86/14	7.8
2014	446,785	61,948	13.9	86/14	13.1

Source: Clark County Assessor GIS records [based on the population](#). [From 1995 through 2014, the total population of the county grew from 279,522 to 446,785, which is total growth of 167,263. During the same time, the county's rural population grew from 43,254 to 61,948, or 18,694 additional residents in the rural area. The overall percent of the county's total population growth from 1995 through 2014 that occurred in the rural area was 11.2, and the urban/rural split, as that term is generally used for comprehensive planning, was 89/11.](#)

The following table documents the actual capacity of the rural area to accommodate the potential population increase for Alternative-1 and Alternative-4 using updated assumptions B compared to A assumptions considered in the DSEIS.

	Alt-1 Capacity per DSEIS	Alt-1 Actual Capacity	Alt-4 Capacity per DSEIS	New Alt-4 Actual Capacity
Rural Zone	5,684	2,570	9,880	4,710
Agriculture Zone	970	286	1,958	733
Forest Zone	419	162	563	1,097
Nonconforming likely <u>10%?</u>		183		74
Other Rural Zones		124		124
Gross potential growth home sites	7,073	3,325	12,401	6,638
15% Market Factor deduction <u>The market factor is an addition to the land needed in an urban growth area to accommodate 20-year growth projections, because of assumed fluctuating demand for that area. WAC 365-196-310(4)(b)(ii)(F). -is an addition</u>	0	-499	0	-996
Net potential growth of home sites	7,073	2,327	12,401	5,642
Potential population growth	18,814	6,190	32,987	15,008
Potential population growth without market factor	18,814	8,845	32,987	17,657

Formatted: Left

Source:

Columns 1 and 3 are from the DSEIS. If Columns 2 and 4 are based upon the assumptions in this document, they are faulty, as detailed within. -Subtracted Alt 2 and 3 from our no action Alt 1. Alt 4 is actually new Alt 4 proposal, not the Alt 4 that was studied in the DSEIS.

The following table provides the forecasted population for choices A and B.

ref	Year	County-wide Population A	County-wide Growth A	Urban Growth A & B	Rural Growth B	County-wide Growth B	County-wide Population B
0	2015	448,845 7865	0	0	0	0	447865 448,845
1	2016	453591	5726	5153	721	5874	453739
2	2017	459391	11526	10373	1452	11825	459690
3	2018	465265	17400	15660	2192	17852	465717
4	2019	471213	23348	21013	2942	23955	471820
5	2020	477238	29373	26436	3701	30137	478002
6	2021	483340	35475	31928	4470	36398	484263
7	2022	489520	41655	37490	5249	42739	490604
8	2023	495779	47914	43123	6037	49160	497025
9	2024	502118	54253	48828	6836	55664	503529
10	2025	508538	60673	54606	7645	62251	510116
11	2026	515040	67175	60458	8464	68922	516787
12	2027	521626	73761	66385	9294	75679	523544
13	2028	528295	80430	72387	10134	82521	530386
14	2029	535050	87185	78467	10985	89452	537317
15	2030	541891	94026	84623	11847	96470	544335
16	2031	548819	100954	90859	12720	103579	551444
17	2032	555837	107972	97175	13605	110780	558645
18	2033	562943	115078	103570	14500	118070	565935
19	2034	570141	122276	110048	15407	125455	573320
20	2035	577431	129566	116609	16325	132934	580799

Thus the 2035 rural population growth forecasted using assumptions choice B is 16,325 that leaves the forecasted urban growth rate the same but updates the urban/rural split to 86/14. Craft a response...notes this is the population split, not the growth rate split. Table uses 1.308%. See Population Comparisons chart below, with corrected 2015 base number.

Correcting the population growth planning assumptions:

The planning assumptions published on Table S-1 on page of the SDEIS show the following:

Total population projection for 2035 = 577,431

Projected new residents = 129,566

The 2015 population = 577,431 – 129,566 = 447,865

Annual population growth rate = 1.25%

Urban/rural population growth split = 90% urban, 10% rural

Thus the 2035 urban population growth = 129,566 This number is incorrect; the correct number is 128,616, and is shown on Table 1-1 Summary of Planning Assumptions on page 1-2 of the DSEIS.

*0.9 = 116,609

Thus the 2035 rural population growth = 129,566 *0.1 = 12,957

The more precise annual population growth rate using the original choice A assumptions is calculated as follows:

$577,431 / 447,865 = 1.2893$

The 20th root of 1.2893 = 1.279 which translates to a 1.279% annual growth rate.

Councilor Madore's calculation of the growth rate results in the average annual geometric growth rate compounded annually. Planning and GIS, however calculate an average annual exponential growth rate with continuous compounding.

The corrected annual population growth rate is calculated as follows:

$580,799 / 447,865 = 1.29682$

The 20th root of 1.29682 = 1.01308 which translates to a 1.308% annual growth rate.

Thus, the forecasted annual population growth rate using choice A assumptions is 0.029% higher than the forecast of choice A assumptions.

(1.308% - 1.279% = 0.029%) The method used to calculate the growth rate here

results in the average annual geometric growth rate compounded annually. Planning and GIS, however calculate an average annual exponential growth rate with continuous compounding.

The corrected planning assumptions for choice B are as follows:
 Total population projection for 2035 = 580,799 (0.58% different)
 Total county-wide increase = 132,934 persons (2.6% different, 132,934 / 129,566)
 Annual county-wide population growth rate = 1.308% (0.029% different)
 Urban/rural population growth split = 86% urban, 14% rural (updated from 90/10)
 Thus the 2035 urban population growth = 116,609 persons (same)

Population Comparisons

	<u>DSEIS</u>	<u>Corrected 2015 base population</u>	<u>Proposed</u>	<u>Proposed with 2015 base population adjustment</u>
<u>2015 Base</u>	<u>448,815</u>	<u>448,845</u>	<u>447,865</u>	<u>448,845</u>
<u>Growth</u>	<u>128,616</u>	<u>128,586</u>	<u>132,934</u>	<u>131,954</u>
<u>2035 forecast</u>	<u>577,431</u>	<u>577,431</u>	<u>580,799</u>	<u>580,799</u>
<u>Average Annual Exponential Growth Rate (Continuous Compounding)</u>	<u>1.26</u>	<u>1.26</u>	<u>1.30</u>	<u>1.29</u>
<u>Average Annual Geometric Growth Rate (Compounding Annually)</u>	<u>1.27</u>	<u>1.27</u>	<u>1.31</u>	<u>1.30</u>

Planning and GIS have provided a corrected 2015 base population of 448, 845. Based on that number, the countywide growth over 20 years is estimated to be 128,586. The estimated growth rate would then be 1.29 %.