City of Laconia, New Hampshire
Build-Out Analysis

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Introduction

'Build-out' refers to the time and circumstances whereby, based on a set of restrictions, no more building growth may occur. For our purposes it means the point at which, under current zoning requirements, no more residential lots and/or units may be created in the municipality. It is the point at which lots have been subdivided and/or developed to make the maximum number of dwelling units allowed by zoning ordinance. For practicality, general assumptions must be employed when doing a municipality-wide build-out.

The Lakes Region Planning Commission (LRPC) has performed a build-out analysis for the City of Laconia. The City is interested in predicting the development potential for existing lots within the City. The City may use the results of the build-out in the framework of its master planning process.

LRPC performed the build-out analysis using Geographic Information Systems (GIS). Specifically, ArcGIS 9.1 GIS software, Spatial Analyst Extension and Microsoft Excel 2000 software was used during the analysis process. This report summarizes the methodology and findings of the LRPC in its performance of the build-out analysis.

Goals of this Build-Out

This build-out attempts to use existing (or derived) GIS datasets to determine estimations of the following:

1) Number of potential residential lots at Build-Out

2) Number of potential residential units at Build-Out

3) Number of potential additional residential lots at Build-Out

4) Number of potential additional residential units at Build-Out

5) Potential number of additional Seasonal and Resident units

6) Potential population associated with additional Seasonal and Residential units.

7) Acreage for future development for Non-Residential zones

Methodology

The Build-Out was performed following these General Steps:

1. Acquire existing GIS layers including polygon composite tax map layer and zoning.
2. Develop Natural Building Constraints (non-buildable areas) Layer.
3. Link Assessing Database to tax map layer.
4. Overlay Tax Map, Zoning, and Constraints layers for Build-Out layer.
5. Determine the buildable and non-buildable area for each lot.
6. Calculate an estimate of the number of potential build-out units & lots per existing Residential lot according to zoning requirements.
7. Report the number of build-out units & lots for Residential zones.
8. Calculate and estimate of the total number of additional housing units and potential population growth, reporting numbers by potential seasonal and resident units.
9. Calculate an estimate of potential future development acreage for Non-Residential zones.
10. Produce maps to illustrate the relative developability of existing lots.

Build-Out Assumptions

This build-out analysis, for practical reasons, can't accurately study the specific geography of each existing lot. Nor can it successfully model every building parameter and every possible way that a lot may be developed. Therefore, several assumptions must be made and followed in the processing of the data. The build-out is also constrained by the use of the best available GIS data.

Zoning District Type

The Zoning districts are separated out to Residential and Non-Residential districts. The Residential districts are further divided into Single Family, Two Family and Multi-Family. They are listed as follows:

Single Family	Two-Family	Multi-Family	Non-Residential
RR1	RG	DRD	I
RR2	SFR	RA	IP
RS	CR*	CR	AI
			BC
			BCI
			C
*Lots not having both municipal water and sewer			P

The following table was extracted from the City planner's Residential Use Table. This shows the permitted residential uses within each zone. While the different zones may allow multiple types of development, this study is concerned with maximizing residential growth. Therefore, where multi-family is allowed, it is processed accordingly. Likewise, for Two-family. Residential development may be permitted in the "Non-residential" zones but this is not processed for residential build-out development as these zones are more intended for commercial and/or industrial use, and the City zoning ordinance implies that all future subdivision and lot development should be done so in accordance with the intent of the zone. Also, at build-out, commercial property will be very important to support the potential residential population and would be likewise be very valuable.

RR1	RR2	RS	SFR	RG	RA	RESIDENTIAL USES	P	CR	DR	BC	C	BCI	IP	I	AI
N	N	N	E	E	P	Multifamily dwelling	E	P	P	E	N	E	N	N	N
P	P	P	P	P	P	Single-family	P	P	P	P	P	P	N	N	N
N	N	N	P	P	P	Two-family dwelling	P	P	P	P	P	P	N	N	N

Section of Zoning Use Table

Zoning Districts As Listed in the City Zoning Ordinance

A.   Residential Rural (RR1) District. The Residential Rural District shall be designed to accommodate residential uses in what is commonly recognized as being a rural environment. Generally, the property included within this district will not have sewer and water facilities available. Agriculture, open space and other low-intensity uses shall also be permitted.

B.   Residential Rural Corridor (RR2) District. The Residential Rural Corridor District is intended to recognize the historic, scenic and agricultural values of the areas associated with Parade, Meredith Center and White Oaks Roads. Further, public health and safety considerations will be enhanced by anlocating for on-site sewer and water systems since the majority of these areas are not served by municipal water and sewer. This district is defined as the area extending 400 feet from either side of the center line of

the right-of-way of the above-mentioned roadways, excluding those areas in the Commercial Resort District.

C.   Residential Single-Family (RS) District. The Residential Single-Family District shall be designed to establish and maintain attractive areas used solely for single-family residences and closely related supporting facilities such as schools and churches.

D.   Shorefront Residential (SFR) District. The Shorefront Residential District is designed to recognize the unique characteristics of the residential community associated with Lake Winnipesaukee and Weirs Beach.

E.   Residential General (RG) District. The Residential General District is designed to allow a variety of housing types and supporting facilities, including recreational, educational and religious uses, which complement and make more practical medium densities of residential development. This district shall normally be located with relatively easy vehicular and/or pedestrian access to business or commercial areas, and public utilities shall be available prior to the time of zoning.

F.   Residential Apartment (RA) District. The Residential Apartment District is designed primarily to allow moderate- to high-density multifamily developments of varying sizes and types in areas where such advantages as public facilities, utilities, transportation facilities, places of employment and/or commercial facilities are present, coupled with an attractive or particularly convenient site.

G.   Professional (P) District. The Professional District is designed to provide attractive professional areas outside the retail commercial core. This district contemplates allowing professional office facilities to be located adjacent to important access routes in reasonably close proximity to the higher-density residential zones, with minimal change to the outward physical appearance of the areas involved.

H.   Business Central (BC) District. The Business Central District is established in recognition of the fact that commerce and business tend to concentrate in a central area. This area is intended primarily for retail, office, civic, financial and cultural uses, coupled with limited apartment, transient residential, recreational and comparable supporting facilities.

I.   Commercial Resort (CR) District. The Commercial Resort District is primarily intended to set aside areas where establishments catering to the dining, lodging and recreational needs of tourists or seasonal residents may be located. Also to be permitted in this district are such commercial residential uses as garden apartments and condominiums. The district shall generally be located adjacent to major tourist routes and attractions. Development will be encouraged which is characterized by open space, attractive landscaping and ample off-street parking areas. It is anticipated that small shops and retail stores may be located within this district as they meet the intent and requirements of this chapter.

J.   Commercial (C) District. This district is intended to provide an area for those commercial or restricted industrial facilities with an attraction and customer service area which goes beyond the immediate neighborhood. Development contemplated within this district shall be required to provide adequate off-street parking areas on lots which relate in size to the contemplated building area. Availability of utilities shall be an important consideration.

K.   Business Central/Industrial (BCI) District. This district is intended to recognize specific areas within the City that have served as core areas for development. These areas are generally characterized by the presence of older, large industrial buildings with surrounding commercial areas. The intent of this district is to permit expansion of both industrial and commercial uses.

L.   Industrial Park (IP) District. The Industrial Park District is intended to encourage development of an industrial park area for industries which have operations primarily within a building, minimal outside storage and abundant off-street parking facilities; such industries shall be located on spacious lots where utilities are available in an attractive setting.

M.   Industrial (I) District. The Industrial District is intended to recognize, where feasible, existing industrially used areas and to permit controlled expansion of these industries; to provide for new transportation-related industrial uses; and to provide for smaller industrial sites in a variety of locations.

N.   Airport Industrial (AI) District. The Airport Industrial District is created to recognize the geographical relationship between the industrial district at the airport in Gilford and land in Laconia adjacent to the Gilford district. The district provides expanded industrial opportunities from Route 11C (Lily Pond Road). The district is defined as that land bounded to the west by the easterly edge of the PSNH power line right-of-way, to the east by the Gilford/Laconia municipal boundary, to the north by the lot boundary between Lot Nos. 80B-79-4 and 80B-244-6, and to the south by the Commercial District associated with Rich's Plaza.

O.   Downtown Riverfront (DR) District. The Downtown Riverfront District is created to provide opportunities, incentives and requirements to acknowledge and respect the Winnipesaukee River in the downtown area between Lake Opechee and Lake Winnisquam. The river is a focal point in the city's history and heritage and should be a critical factor in any redevelopment within the district. The district is defined as outlined on the official Zoning Map.

Lots split between more than one zoning district are logically evaluated

There are many lots, especially between zones RR1 and RR2 that exist in more than one zone. As these zones will have different development parameters (minimum lot size, minimum buildable area) there may be different combinations of potential development

at build-out, rather than just simply evaluating each lot part per its zoning district. See the section on Split-Zone Lots for more information.

Lots will be subdivided and/or developed to the maximum potential.

This build-out assumes that all existing development that is NOT currently built to maximum capacity will be eventually redeveloped to maximum capacity at build-out. Thus, all lots within zones allowing two-family, but presently having a single-family unit, will be rebuilt with a two-family structure.

Front, side, and rear setback areas, structure height and minimum greenspace are not considered in this study.

These building parameters are too site and building specific and can't be adequately modeled within the scope of this study.

City, County, State or Federally Owned and Conservation Lands

It is assumed, for the purposes of this build-out, that existing city, county, state and federally owned lots and Conservation lands (permanent recognized conservation easements) will remain as currently developed. They will not be subdivided and no more residential units (if any at present) will be built upon them. Government owned lots were reselected from the assessing database based on Use Code and were also identified on draft maps by municipal participants. [Cemeteries were also noted by municipal participants and were removed from the build-out analysis.]

Road Right-of-Way Area

Where potential build-out lots are predicted to exist where there are no presently existing roads, buildable lot acreage will be subtracted from the existing lot.
 This is to be subtracted at the rate of :

Minimum frontage requirement X ½ the Road-ROW width.

This would yield a minimum area to be associated with roads per lot. For this study, the Road ROW used was 50 feet.

This will be considered only for single/two-family zoning districts, as multi-family (units) are calculated differently than this.

Existing Road Frontage had to be derived from GIS analysis of the digital parcel layer. Discrepancies may exist between the real frontage and what the GIS analysis measured, although this is the best available data.

Availability of Municipal Water and Sewer Service

Any existing lot that is within or touches the boundary of the water/sewer service areas GIS layer produced by the New Hampshire Department of Environmental Services, is considered as having whichever service(s) as identified in said GIS layer. NOTE: the City of Laconia provided a CAD layer of the sewer distribution system, but it was not as useful to the build-out analysis, other than for verification purposes. The City did not have a complete water distribution system layer, therefore the DES layer was the best available data.

Build-Out Input Details

Residential Zoning Requirements

Crucial to a Build-Out analysis is the feasibility of modeling Zoning requirements. This study used the minimum allowable lot size and minimum required buildable area per lot by zone to determine the build-out units and lots. Certain zoning requirements are too site specific to be able to incorporate into the analysis, for example 'Building Setbacks'. Since the build-out is really a matter of aggregating and dividing land areas, while not knowing the real site design potential of a subdividable lot, the area removed for building setbacks cannot be pre-determined. The following table lists the Zoning requirements for the City of Laconia that were used in this study.

DIMENSIONAL STANDARDS: RESIDENTIAL USES						
	Minimum Land Area [c]			Maximum	Minimum Lot Frontage [a]	
District	NO Municipal Utilities	With Municipal Water or Sewer	Municipal Water and Sewer	Residential Density Units/Acre	No or One Utility	Water and Sewer
RR1	2 acres	2 acres	2 acres		250	250
RR2	2 acres	2 acres	2 acres		250	250
RS	2 acres	40,000	10,000		100	80
SFR	2 acres	40,000	10,000	6	100	80
RG	2 acres	40,000	10,000	6	100	80
RA			10,000	9		80
P			10,000	6		80
BC			10,000	6		80
CR	2 acres	40,000	10,000	6	160	80
C		40,000	8,000	6	150	80
BCI			10,000	6		80
DR			Exempt	20		Exempt [d]

In addition to the above parameters, a minimum buildable land area is required for each single and two-family residential lot. For the purpose of this study, buildable land is any land that is not wetland, wetland buffers or steep slopes. See the section on *building constraints* for more information. This study did not use a minimum buildable area for Non-residential district development, as this was not specified in the zoning ordinance.

The following excerpt from the Laconia zoning ordinance lists the required buildable land area for residential zoning districts, all of which were incorporated into this study.

D. [Amended 3-23-1998 by Ord. No. 03.98.03] Buildable land area, residential. Each lot developed for single-family or two-family residential development shall have a minimum of 20,000 square feet of buildable land area where on-site septic or water supply are permitted and will be utilized. Lots served by municipal water and sewer shall meet the following square footage requirements for buildable land area:

(1) RR1 and RR2: 6,000;

(2) RS and SFR: 4,500;

(3) RG, RA, P, CR, C: 3,000; and

(4) BC and BCI: 1,500.

(5) DR: exempt. [Added 5-22-2000 by Ord. No. 05.2000.05]

Non-Residential Zoning Requirements

The following table lists some of the lot requirements needed for nonresidential use. This analysis developed an estimate of the potential future development acreage per existing Non-residential zone lot.

For the scope of this study, only the minimum lot size was used to determine future development potential of existing lots; if the lot has a unit and it is already at its minimum allowable lot size, then there is no more acreage for future development.

DIMENSIONAL STANDARDS: NONRESIDENTIAL USES					
	Minimum Land Area			Minimum Lot Frontage	
		With Municipal	Municipal		
	No or One	Water or	Water and	No or One	
District	Utility	Sewer	Sewer	Utility	
RR1	2 acres	2 acres	2 acres	250	250
RR2	2 acres	2 acres	2 acres	250	250
RS	2 acres	40,000	10,000	100	80
SFR	2 acres	40,000	10,000	100	80
RG	2 acres	40,000	10,000	100	80
RA			10,000		80
P			10,000		80
BC			Exempt		Exempt
BC/I			20,000		100
DR			Exempt		Exempt
AI	1 acre	1 acre	1 acre	100	100
CR	2 acres	40,000	8,000	160	50
C		40,000	8,000	150	80
IP			60,000		200
I			20,000		100

Building Constraints

Building constraints, or non-buildable land, used in this analysis were wetlands and their respective buffers as outlined in the Wetlands Conservation and Water Quality Overlay District. Also, steeply sloped land, sloping 25% or more is considered non-buildable.

According to the City of Laconia Zoning Ordinance…

"BUILDABLE LAND AREA -- That land area other than areas which consist of wetlands or steep slopes, and excluding setbacks, height and configurational limitations. [Amended 10-14-1997 by Ord. No. 10.97.10]"

"STEEP SLOPE -- All land area with a slope equal to or greater than 25% with a minimum width of 50 feet measured perpendicular to the slope."

"~ 235-17. Wetlands Conservation and Water Quality (WC) Overlay District.

 A. Authority. The WC Overlay District is established in accordance with the provisions of RSA 674:21, Innovative Land Use Controls and is considered to be an innovative land use control. Within the WC District, the Planning Board is authorized to administer and grant conditional use permits for certain types of development. [Amended 5-22-2000 by Ord. No. 05.2000.05]

Wetlands shall be delineated by a certified soil scientist as licensed by the State of New Hampshire.

 D. Wetland buffer.

 (1) Wetland buffer areas shall be defined as all land lying:

 (a) Within 75 feet outside the boundary of any prime wetland. *

 (b) Within 50 feet outside the boundary of any non-prime wetland contiguous to public waters and including the following brooks: Durkee Brook, Jewett Brook, Black Brook, Langley Brook, Mellinger Brook and unnamed brooks designated A through I on the Official Zoning Map.

 (c) Within 30 feet outside the boundary of any other wetland.

* NOTE: Laconia had no prime wetlands at the time of this study.

Additionally, Conservation Lands (permanent recognized conservation easements) and City owned lot were used building constraints for this study.   Thus, it is assumed that these will always remain either undeveloped, or remain as existing.

GIS layers were created to represent these areas using the best available sources. These layers are discussed in more detail in the Data Development section.

The Floodplain District and the **Shoreland Protection District** were not used as constraints in this build-out analysis. These districts outline the manner in which structures will be built but they do not limit or exclude residential development.

Data Development

Tax Parcel Polygon Development

An important GIS data layer to be developed for the project is a polygon composite tax map. The City was able to provide the digital files used to produce the City's tax maps in GIS format. The digital tax map data was created by Cartographic Associates Incorporated of Littleton, NH. Some amount of work was needed to prepare this layer for use in the analysis, although, relatively speaking, this was minimal in the overall project.

Joining the Assessing Database

An important step in the build-out process was joining or matching, the GIS parcel layer to assessing information. The purpose of which is to acquire the number of existing units for each parcel. Along with the GIS parcel layer, the City also provided an assessing database file containing fields that were used to match the parcel layer to the assessing data. The assessing file (gis database download.dbf) had a field called "Rem_GIS_ID", which with some editing was fashioned into a field "Link-Id" to be used to join the data to the parcel layer. Much checking and some recoding was necessary in this process in order to distinguish some lots not achieving a match. There were probably limited to newer lots and other records for which the database was out of sync.

Merging the Assessing database with the Tax Parcel Polygon Layer yields information that is vital to the build-out analysis. Gaining this link populated the tax parcel layer with fields from the assessing database necessary for build out. When matching parcel data to assessing information, a one to many match will exist. That means that the assessing database may have several records for one parcel. As such, that is the case with condominiums, but it also was the case with other taxable objects such as 'Outbuildings' or 'travel-trailer'. To garner a list of existing units per lot, the assessing database was first summarized on Link-Id to get the number of records. Before this was done, records associated with such things as 'Outbuildings' and 'travel-trailer' were removed.

Additionally, the fields "Grantee" and "Co-Grantee" reveal all properties that are owned by the City, for use as constrained for residential development.

Zoning Data Layer

The zoning GIS layer was provided by the City and was included with the tax parcel GIS data produced by Cartographic Associates Inc. The zoning layer used in this analysis is the same layer that is used to make the City's Official Zoning Map.

Natural Building Constraint Layers

Natural Building constraints were derived from the best readily available GIS sources.

Wetlands: US Fish and Wildlife Service National Wetlands Inventory. This GIS layer was obtained from NH GRANIT, the state's GIS.

Surface water (also wetlands) surface water: streams and water bodies were obtained with the Cartographic Associates Inc. tax map data.

Wetlands buffers: Produced by identifying and buffering all wetlands by the proper distance as outlined in the Wetlands Conservation and Water Quality Overlay District of the zoning ordinance.

Steep Slopes: Digital Elevation Model (30 meter-DEM) were downloaded from NH GRANIT and processed with Spatial Analyst extension to produce polygon areas of slopes greater than 25%.

Conservation Lands: Permanent conservation easements as archived in the NH GRANIT database were corrected to match the Laconia parcel data, and were coded with the relevant Link_Id for use in the build-out data processing.

City Owned Lots: There were reselected from the assessing database. Anything with a Grantee or Co-Grantee listing the City, was used.

Note: Conservation Lands and City Owned Lots were mapped and supplied to the City Planner for verification, prior to analysis.
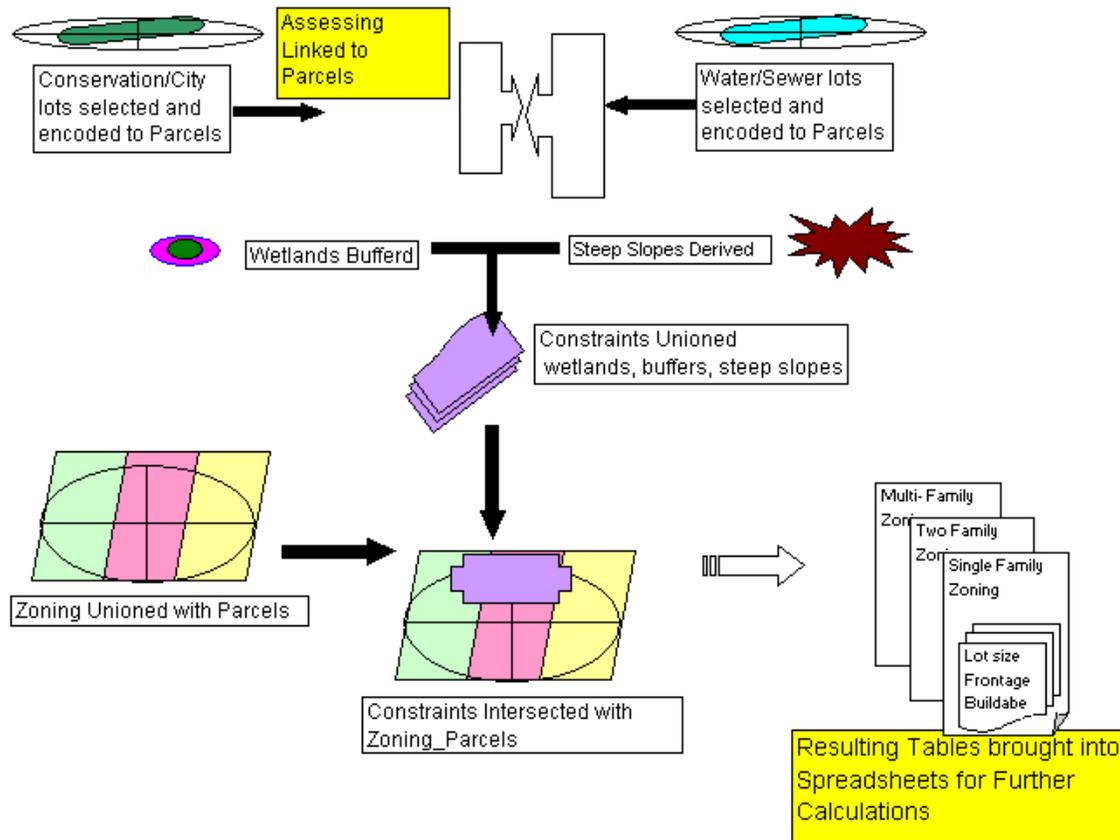
Generalized Process for Data Development

Overlay Analysis and Build-Out Calculation

Once the development of the necessary datasets was completed, overlay analysis to identify development potential could be performed. Overlay analysis is a GIS software procedure to combine the various data layers together to make spatial comparisons. For Build-Out analysis it is used to determine the buildable areas per lot. Once the input data layers have been readied, overlaying the GIS inputs is a simple procedure.

The most complex technical operations occurred in figuring the build-out calculations. To accomplish this, the data tables produced in the GIS overlay process are carried into MS-Excel spreadsheets to process the total area and buildable lot areas using the proper zoning parameters.

Separate workbooks were created to process the different classes of development: Multi-Family, Single/Two-Family, Non-Residential and the Split-Zone-Lots. In addition, the

lot records for each zoning district were calculated within separate worksheets. Each worksheet utilized user-input variables, which may be edited. Inputs include :minimum lot size; minimum buildable area; minimum frontage. All of which may be different depending upon the availability of water and/or sewer service for the lot. Also, ROW width was a user input variable.

Single/Two-Family Calculation Process

The total lot area comprises buildable AND non-buildable land. The basic logic in calculating the build-out lots is as follows:

Number of Potential Lots = The LESSER OF:

The total lot area divided by the minimum lot size, OR
The total buildable area divided by minimum buildable area, OR
The total lot frontage divided by the minimum frontage

Unless, there is adequate buildable area to put in subdivision roads to supply needed frontage. In that case, the land area for each potential new lot is subtracted from the totals, along with an amount of buildable land area to cover road right-of-ways.

Three Cases of Development

Each worksheet processed the Single/Two-family lots three ways. Each case examines the amount of land useable for total lot area and buildable lot area.

1. Maximum number of potential lots with no subdivision roads-Considers only existing lot frontage.
2. Maximum number of potential lots with subdivision roads AND use of existing frontage
3. Maximum number of potential lots with subdivision roads

All calculations are done concurrently on the spreadsheet. The final result is taken from whichever calculation yields the highest number of potential lots. If the field listing Conservation/City Owned status (BO_STAT) shows the name of a conservation easement or a city lot, then the Build-Out lot is set to '1'. This is the same in every residential case.

NOTE:
It was found that most build-out lots would be created under Case 3 above. Case 2 proved ineffective, as this case needed to subtract more land for road-ROW to extend down the sides of the lots with existing frontage. The sides are longer than the frontage for most regular sized lots with minimum frontage.

Number of Potential Units

The number of potential units was set to 1 X each potential build-out lot for Single Family zones and was set to 2 X each potential build-out lot for Two-family zones. If the field listing Conservation/City Owned status (BO_STAT) shows the name of a conservation easement or a city lot, then the Build-Out unit value is set to equal whatever the existing number of units may be.

Number of Additional Units

The number of additional units was set to the difference between the number of potential build-out units to the number of existing units.

Multi-Family Process

The Multi-family process was somewhat simpler than the single/two family process because it did not consider subdivision roads. It simply:

Checks to see if the existing lot meets the required minimum lot size; if not no further development may occur – potential lots = 1, potential units = existing units.

Determines amount of buildable land and applies the maximum unit density for each buildable acre. No lot subdivision is assumed, just further multi-family development. Therefore, potential lots = 1 while potential units depends on the calculation. Additional units are calculated based on existing units. And again, if Conservation or city owned lots are listed, these will remain as-is at build-out.

Zone RR2			66	Existing Lots*	66	Existing Lots*		RR2		SEWWAT	Sewer/Water Sewr	Min.Total Sq. Ft	Frontage
		66 records	53	Existing Units	53	Existing Units				b	Sewer And Water	87120	250
			66	Build-Out Lots	66	Build-Out Lots		single		1	Sewer OR Water	87120	250
			57	Build-Out Units	56	Build-Out Units				N	Neither one	87120	250
			0	Additional Lots	0	Additional Lots							
			4	Additional Units	3	Additional Units							
	*EXCLUDING ANY SPLIT-ZONE-LOTS				REDUCED BY CONSERVATION AND CITY OWNED LOTS								

ZONE_	FEATURE_ID	SEWWAT	Min_STYLE_	Min_ZONE	Units	Frontage	ListUpCat	M_DIV	PO_Slot	RRG_ID	Shape_Leng	Shape_Area	PC_AREA
ZONE	FORMULA ROW	b		RR2	1	756	2	2		793	4065	562020	
RR2	parcel	N			0	0	1	99	LACONIA CITY OF-BATCHELDER CEMET	796	170.94197064300	1774.29100340000	0.82034687000
RR2	parcel	N			0	41	1	99	LACONIA CITY OF-CEMETERY	902	161.51610296500	1615.95757081000	0.00000000000
RR2	parcel	N			0	80	1	99	LACONIA CITY OF-CROCKETT CEMETERY	901	144.67553927000	1245.35822642000	0.00000000000
RR2	parcel	N			0	187	1	99	LACONIA CITY OF-OPECHEE CEMETERY	925	471.11153374100	11599.49790900000	0.00000000000
RR2	parcel	N			0	32	1	99	LACONIA CITY OF-POUND LOT	915	115.90875527100	829.14442251200	0.00000000000
RR2	parcel	N			0	0	1	99	LACONIA CITY OF-ROBINSON CEMETER	863	187.02597651400	2081.00732253000	0.00000000000
RR2	parcel	N			0	129	1	99	LACONIA CITY OF-TOWN CEMETERY	826	521.03794935800	16973.82636790000	0.00000000000
RR2	parcel	N			0	521	1	99	LACONIA CITY OF-VAC/WETLANDS	843	2406.36980024000	166109.38072200000	149966.41830500
RR2	parcel	N			0	1972	1	99	Prescott State Forest	859	1972.41314630000	143147.15366900000	0.00000000000
RR2	parcel	1	Cape Cod	RROD	1	103	1	99		612	511.52927602900	15611.50765970000	0.00000000000
RR2	parcel	1	Cape Cod	RR2	1	75	1	99		613	1455.34054907000	85792.55172220000	0.00000000000
RR2	parcel	1	Cape Cod	RROD	1	105	1	99		614	514.23185410000	15762.37384390000	0.00000000000
RR2	parcel	1	Cape Cod	RR2	1	129	1	99		616	560.09826057700	19327.25943630000	0.00000000000
RR2	parcel	1	Conventional	RR2	1	424	1	99		619	809.31856084600	40969.70739060000	0.00000000000
RR2	parcel	N	Ranch	RR2	1	109	1	99		621	452.13519807000	12477.24128150000	0.00000000000
RR2	parcel	1	Ranch	RROD	1	176	1	99		625	621.26321533100	23025.90438950000	0.00000000000
RR2	parcel	1	Ranch	RROD	1	129	1	99		626	605.52955115300	22500.05652460000	0.00000000000
RR2	parcel	1	Colonial	RR2	1	332	1	99		627	880.93330623800	28404.72761040000	0.00000000000
RR2	parcel	1	Family Conver.	RR2	1	186	1	99		630	1085.39277969000	69447.53917890000	0.00000000000
RR2	parcel	1	Ranch	RR2	1	303	1	99		631	597.56493105100	22082.29163280000	0.00000000000
RR2	parcel	1	Raised Ranch	RR2	1	330	1	99		632	651.07944474900	25915.25534020000	0.00000000000
RR2	parcel	N			0	701	1	99		795	1223.48676904000	93560.61753720000	52724.64515470
RR2	parcel	N	Cape Cod	RROD	1	423	1	99		803	1471.99267220000	134702.48816100000	124.69348941900
RR2	parcel	N	Comp Year Rnd	RROD	1	784	1	99		807	1869.17731955000	161808.79126700000	29331.68106160
RR2	parcel	N	Comp Seasonal	RROD	1	95	1	99		811	831.57935718400	42322.95590200000	0.00000000000
RR2	parcel	N	Single Wide	RR2	1	0	1	99		819	580.76306656700	20793.99029810000	1557.74501925
RR2	parcel	N	Cape Cod	RR2	1	231	1	99		821	781.25437053600	30638.32131570000	5250.24019677
RR2	parcel	N	Ranch	RROD	1	725	1	99		823	1341.69756607000	86807.10559140000	0.00000000000
RR2	parcel	N			0	278	1	99		824	581.26091840700	8406.29451993000	5.15563620190
RR2	parcel	N	Colonial	RR2	1	741	1	99		830	1455.76075748000	86617.12117390000	0.00000000000
RR2	parcel	N	Cape Cod	RROD	1	308	1	99		841	923.68759524100	40492.49178430000	8479.72847147
RR2	parcel	N	Antique	RR2	1	416	1	99		845	1243.47306816000	96951.63464750000	4991.14185541
RR2	parcel	N			0	164	1	99		847	864.61310818100	43899.97435840000	0.00000000000
RR2	parcel	N	Comp Year Rnd	RR2	1	251	1	99		850	1231.53573446000	89703.94151190000	18270.37452810
RR2	parcel	N	Colonial	RROD	1	255	1	99		853	1069.69180700000	66768.23480480000	19251.48984260
RR2	parcel	N	Ranch	RROD	1	384	1	99		870	1255.80387279000	94842.72657260000	0.00000000000
RR2	parcel	1	Cape Cod	RR2	1	528	1	99		874	1670.20137515000	166889.16240900000	25067.83166220
RR2	parcel	1	Colonial	RR2	1	742	1	99		877	1408.01439870000	122845.72047000000	0.00000000000
RR2	parcel	N			0	956	1	99		882	1275.60060005000	95923.87501150000	0.00000000000

Example of a portion of a Calculation Sheet for Build-out analysis

Split –Zone Lot Calculations

These instances were the most challenging for this study. These were separated out by parcel-part (rather than lot) into several spreadsheet-separated by zone. The same format of calculation as was done for the Single/Two family and Multi-family units were performed on the parcel-parts. Non-residential zoned portions of split-zone-lots were actually processed within the Non-residential regime and were not considered as relating to the Residential parcel parts. However, the Residential parcel-parts of different zones were considered to have some affect on mutual lot development.

Several cases may occur on these lots. Consider a lot split into two zoning districts.

1. Lot sections for both halves may yield additional lots, on their own
2. One Lot section may be constrained, yet the other is subdivideable
3. One Lot section may be constrained, but would be developable if the area for the other half were brought into consideration
4. Lot sections for both halves may fail the minimum lot size or buildable area

Rather than simply process these parcel-parts as separate entities for the build-out and thus, potentially loose development potential, as in case 3 and 4 above, a logical approach was devised to minimize the loss of buildable acreage for these cases.

The framework for this lies in the idea that some zoning districts are more restrictive than others. It follows that while you may not create a 1 acre lot in a 2 acre minimum district, you could create a 2 acre lot within a 1 acre minimum lot size district. Therefore the separate sections of split-zone lots were processed in tandem, with the lot sections of the

more restrictive districts receiving any needed buildable and total area to make at least 1 lot. The remainder would stay with the less restrictive section for processing its potential build-out lots/units. The logic assumed that each more restrictive lot-section, for instance, the 2 acre zone, would be developed first, taking any needed area from the less restrictive section. Then the less restrictive section is calculated using only area/buildable area within its own section. Trades can only be made in 1 direction.

A ranking system was devised in which the highest ranks are the first to be processed. If needed, lower ranked zones supply area / buildable area deficits to the higher rank section.

RANK	ZONE
1	RR1
2	RR2
3	RS
4	RG
5	CR1N
6	SFR
7	RA
8	CRb
9	DRD

Trading Logic Rank

give direction ⟶

Multi-Family	Less Restrictive Single Family	More Restrictive Single Family
	RR2	RR1
	RS	RR2
	CR -(1 or N)	RR2
DRD	RG	RS
CR-(with "b")	RG	
	CR -(1 or N)	RR1
	SFR	CR -(1 or N)
	RS	RR1
RA	RS	

Trading Logic Split-zone cases and order of giving

Following the calculations of the individual lot-sections, the totals were tallied on a per-lot basis for all 200+ split-zone lots.

Non-Residential Zoning

Non-Residential zoning lots were not processed for build-out potential lots and units. In this study they were examined to estimate the potential acreage of available for future development. That said, this section does NOT consider any redevelopment, nor does it preclude it. It simply tries to estimate the amount of non-built, buildable acreage within each non-residential lot.

This was accomplished by determining the LESSER Value from the following:

1. If the lot is 'built' as determined from the assessing database, subtract the minimum lot size allowed by zoning from the buildable area. The remaining buildable land is the amount available for future development.

2. Buffer building footprint(s)* found on the lot by ½ the square root of the total building footprint area, (limit the buffer to the only the lot upon which it/they are found), then subtract the amount of buildable land that intersects the buffer area from the lots total buildable area.

The lesser value is given as the amount of land available for future development. The first case above would cover existing lots with small buildings on them. The second case would cover larger buildings.

*GIS Layer from City GIS layers

Reporting the Results

The following tables summarize the results of the Build-Out analysis. These tables were derived from the overlay analysis of the existing tax parcels, zoning parameters and the building constraints datasets as earlier defined.

ZONE	EXISTING LOTS	EXISTING UNITS	BUILD-OUT LOTS	BUILD-OUT UNITS	ADDITIONAL LOTS	ADDITIONAL UNITS
CR	530	1450	707	3854	177	2404
DRD	243	241	243	1770	0	1529
RA	74	116	74	572	0	456
RG	1327	1306	1548	3037	221	1731
RR1	446	531	1139	1291	693	760
RR2	66	53	66	56	0	3
RS	2035	2389	4792	5034	2757	2645
SFR	245	278	781	1573	536	1295
Split-Zoning	244	311	2436	3304	2192	2993
TOTAL	5210	6675	11786	20491	6576	13816

Build-Out By Residential Zone Table

This table lists the number of units and lots at Build-Out per residential zoning district. Also listed are the figures for Existing Lots, Existing Units, Additional Lots and Additional Units per zoning district. Note: some 'exiting lots' totaled here are actually sub-lots or outlying portions of lots (such as islands), as mapped in the GIS parcel layer. For the build-out, they were treated as separate entities.

FYI…
For the multi-family districts (CR,DRD, RA) it was assumed that there would be no need to subdivide the existing lot as each lot would be developed or further developed as multi-family. In the case of multi-family development, lots can be maximized by developing as many units as allowed by the maximum residential density as stated in the zoning ordinance. There is an exception to this. Lots in the CR zone that do not have both water and sewer service were figured using the parameters (minimum lot size, minimum buildable area) necessary for single or two-family development and each of this case were given two build-out units for every potential lot.

District RR2 has relatively fewer lots reported for the zone, mostly due to the fact that most of the RR2 lots are split-zone lots and are reported within the Split-Zoning category. It is also revealed that this zone will not gain any new lots at build-out. This is due to the fact that the lots that fall entirely within this zone (and not split) are constrained for subdivision.

Build-Out Map

The results of this analysis may be graphically seen on the build-out map that was produced as a part of this study.

ZONING DISTRICT	TOTAL POTENTIAL ADDITIONAL HOUSING UNITS		SEASONAL	RESIDENT
CR	2404		416	1988
DRD	1529		265	1264
RA	456		79	377
RG	1731		299	1432
RR1	760		131	629
RR2	3		1	2
RS	2645		458	2187
SFR	1295		224	1071
Split-Zoning	2993		518	2475
ALL RESI ZONES	13816		2390	11426

Additional Residential Units – Seasonal and Resident

This table reports the number of additional residential units in the residential zoning districts. It includes a breakdown of Seasonal units and Resident units figured using the Census 2000 figure of **17.3%** Seasonal residential units for Laconia.

ZONING DISTRICT	Additional Population	POTENTIAL POPULATION GROWTH				RESIDENT
			SEASONAL			
CR	5770		998			4771
DRD	3670		635			3035
RA	1094		189			905
RG	4154		719			3436
RR1	1824		316			1508
RR2	7		1			6
RS	6348		1098			5250
SFR	3108		538			2570
Split-Zoning	7183		1243			5941
ALL	33158		5736		TOTAL	27422

Additional Population – Seasonal and Resident

This table reports the number of additional Seasonal and Resident persons based upon the number of additional units as reported in the previous table. The figures are based on The NH Office of Energy and Planning standard of 2.4 persons per household. As listed in the table, at build-out, Laconia may have an additional 40,056 persons added to its current population of 16,941, as estimated by the NH OEP population estimate for 2004.

Differences in Lots and Units

To explain the difference between Number of Units to Number of Lots at Build-Out:
The extra units associated with two-family and multi-family developments comprise much of the difference. Conversely, protected lots (Government owned or conservation lots) will not have any further development on them, which may yield lots with no units.

Non-Residential Zoning

The following table sums the amount of buildable land that is available for future development per non-residential zoning district. This information may be seen on the Build-Out map.

Zone	Future Development Acreage
A1	102.1
BC	2.9
BCI	5.3
C	172.1
I	67.4
IP	47.6
P	30.2
Total	427.5

Conclusions

This type of build-out analysis can help the City of Laconia to predict and plan for future development. Existing lots can be prioritized for development or for conservation. Due to zoning requirements, ownership status and geography, the largest land lots are not necessarily the most developable. This effort allows us to make an estimate of the number of potential lots and units of City, using available GIS data layers.

GIS Build-Out analysis can vary in complexity depending upon the complexity of the input GIS datasets, zoning requirements and the project funding. Assumptions had to be made to model the various zoning requirements. Since we do not know the locations of the potential buildings, nor do we know the specific design of any subdivision, certain zoning requirements could not be addressed within the scope of this project. Building setbacks, for example, and varied overlay district requirements are too site specific for this study.

Major products of this Build-Out Analysis are the Build-Out Excel Workbooks, used by the GIS Specialist in the analysis. These workbooks can be edited by the City to improve the accuracy of the build-out. Editing the numbers for a single lot will automatically update the summary tables provided on the Summary sheet within the Workbook. For instance, conservation easements, not counted in the build-out may be looked up by lot-number and the build-out values recalculated. It may similarly be edited to reflect actual development, as it happens over time. For instance, if the build-out study said 5 potential lots, and the land actually got developed to 4 with a conservation easement, the worksheet can be edited to reflect that, which results in an active tracking over time.

APPENDIX A. Map Products

Zoning Districts Map

Development Constraints Map

Development Status Map

Build-Out Units Map