Methodologies for Holding Capacity Analysis Model Development

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What is the purpose of the Holding Capacity Analysis Model?

- A residential holding capacity analysis provides an estimate of the number of additional housing units that could be built under the existing zoning code and development regulations.
- Results used to support Long Range Planning and land use.
- DPW - roads, infrastructure, and Rec & Parks.
- Considers: Zoning, development regulations, regulated natural features, and land values.
- While the analysis provides an estimated number of residential units, it is not a parcel specific feasibility study or guarantee that the development would or could occur.
- Many factors contribute to determining if and how a property is developed including market changes, finances, private agreements and leases, and the personal preferences of property owners.

Holding Capacity Analysis:

- Identifying properties that can be developed
  - Vacant Land - Assessed value of improvements less than $10,000.
  - Redevelopment Potential - Assessed value of improvements less than assessed value of land. Real estate economics would indicate that property has potential for redevelopment to general higher value.
  - Subdivision Potential - Considers potential for parcels that are in residential zoning districts and have a lot size more than double the minimum lot size for that zone. These parcels have the potential to be subdivided for production of more housing units.

Holding Capacity Analysis:

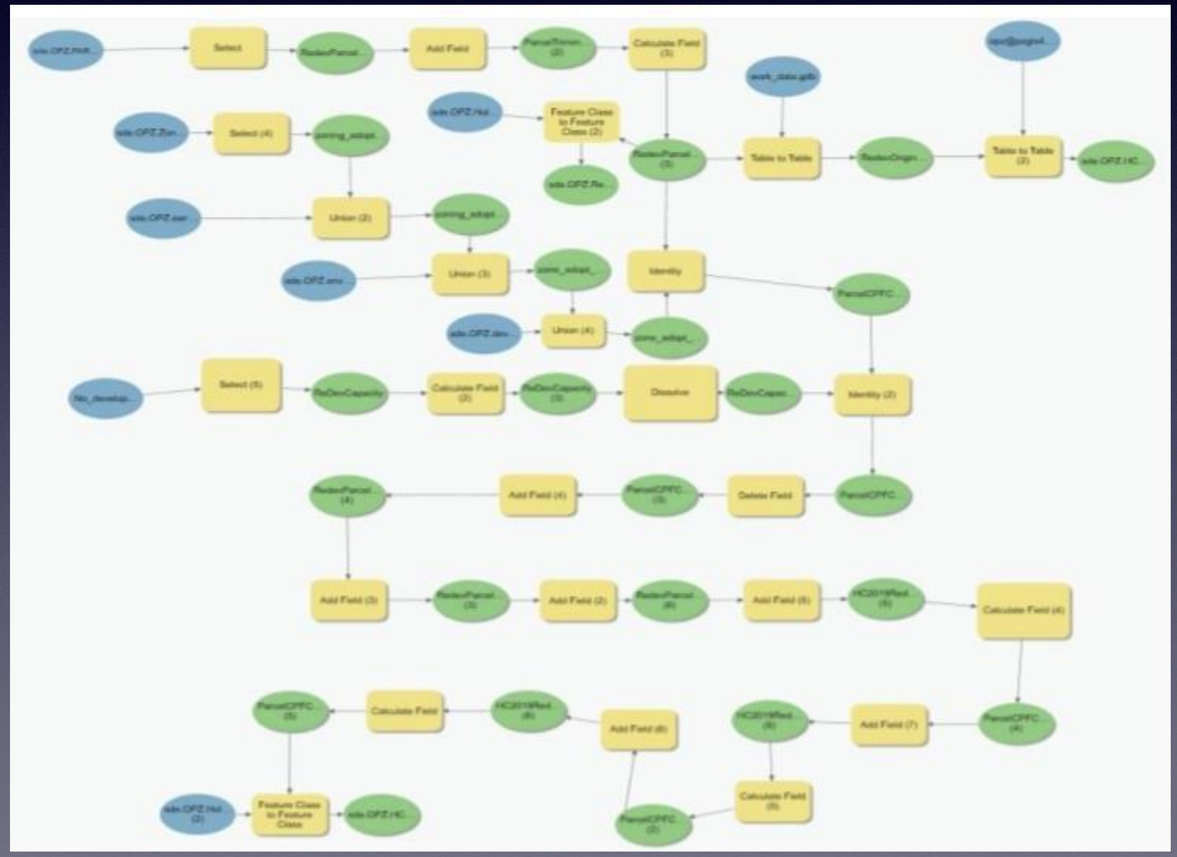
- Identifying properties that cannot be developed.
  - Owned by the Federal, State, or Local Government.
  - Recorded subdivision plats as open space or floodplains.
  - Constrained by recorded conservation easements (such as agricultural preservation easements or conservation easements)
  - Projects currently in the subdivision review process.

Holding Capacity Analysis:

- How are residential units allocated to potential properties?
  - The residential holding capacity model analyzes both:
    - Residential Zoning districts (RA - R22)
    - Other Zoning districts where residential use is allowed by right or as a conditional use (C1, C2, C3, W1, MXD-R, MXD-C, MXD-R, MXD-T, TC, and the Odenton zones)
  - The analysis removes protected natural features (bogs, bog protection areas, steep slopes, wetlands, and stream buffers)

Key Steps in the Model:

- Identify parcels with development potential
  - Step by step model was created using ModelBuilder in ArcGIS Pro



Key Steps in the Model:

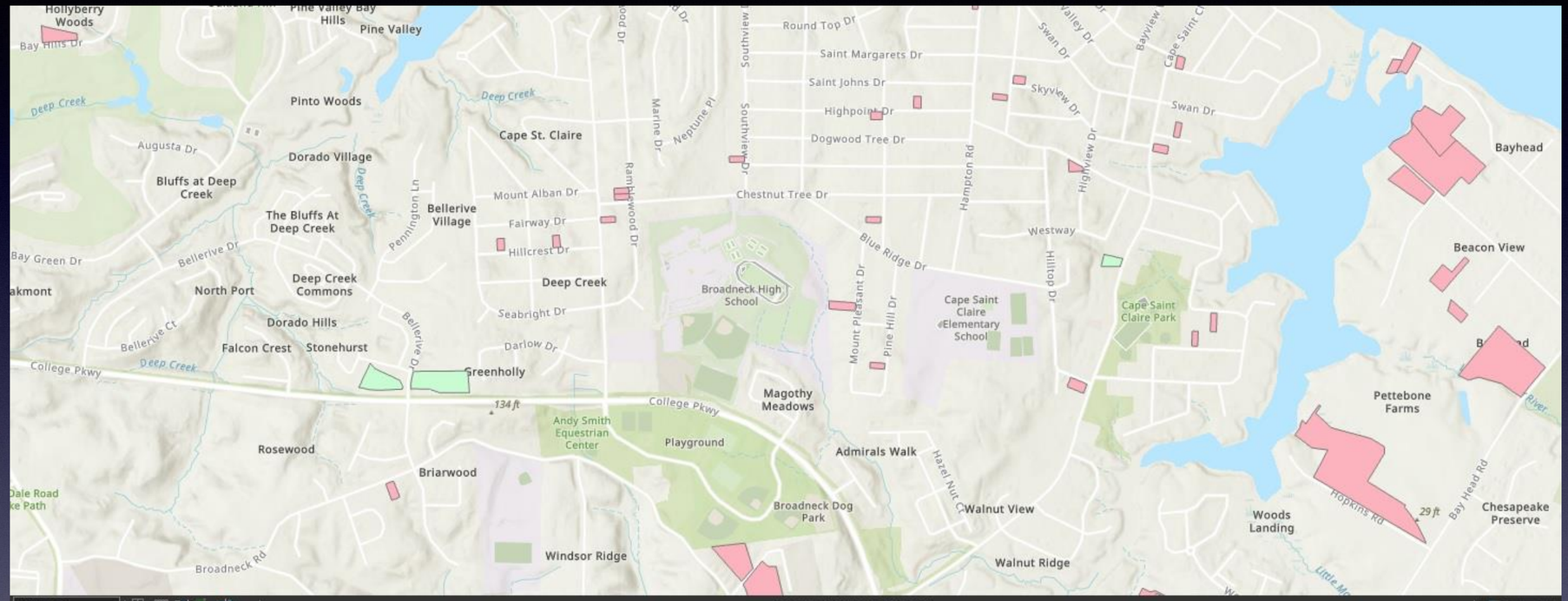
- Calculate actual yields for each recent development in each zone
  - Factors that impact yields, minimum lot size, critical areas, water and sewer service

Case	Zone	Min. Lot Size	Sewer	Critical Area	Yield	Actual Yield (Units/Per Acre) for Lots >Min. Acreage for Subdivision	Min Acreage for Subdivision	Min Lot Size for Development	New Yield Factor	Sq. Ft Range for New Yield Factor
1	R1	40,000 sq.ft.	no	N/A	1/40,000 sq.ft.	0.75	2.75 (120,000 sq.ft.)	8000 sq.ft.	1.09	80,000 - 120,000
2	R1	40,000 sq.ft.	yes	N/A	1/40,000 sq.ft.	0.75	2.75 (120,000 sq.ft.)	4000 sq.ft.	1.09	80,000 - 120,000
3	R1	40,000 sq.ft.	no	RCA	1/ 20 acres	0.05	40	8000 sq.ft.		
4	R2	15,000 sq.ft.	yes	N/A	2.5/acre	1.8	1.03 (45,000 sq.ft.)	4000 sq.ft.	3	30,000 - 45,000
5	R2	20,000 sq.ft.	no	N/A	1/20,000 sq.ft.	0.6	1.38 (60,000 sq.ft.)	4000 sq.ft.	2.2	30,000 - 60,000
6	R2	20,000 sq.ft.	no	RCA	1/ 20 acres	0.05	40	8000 sq.ft.		
7	R5	7,000 sq.ft.	yes	N/A	5/acre	2.7	0.48 (21000 sq.ft.)	4000 sq.ft.	6.3	14,000 - 21,000
8	R5	7,000 sq.ft.	yes	LDA	4/acre	2.2	0.92 (40000 sq.ft.)	4000 sq.ft.	4.5	30,000 - 40,000
9	R5	7,000 sq.ft.	no	RCA	1/ 20 acres	0.05	40	4000 sq.ft.		
10	R10	N/A	yes	N/A	10/acre	8.6	0.18 (8000sq.ft.)	4000 sq.ft.		
11	R10	N/A	yes	LDA	4/acre	2.2	0.32 (14000 sq.ft.)	4000 sq.ft.		
12	R10	N/A	yes	RCA	1/ 20 acres	0.05	40	4000 sq.ft.		
13	R15	N/A	yes	N/A	15/acre	11.5	0.18 (8000sq.ft.)	4000 sq.ft.		
14	R15	N/A	yes	LDA	4/acre	2.2	0.32 (14000 sq.ft.)			
15	R15	N/A	yes	RCA	1/ 20 acres	0.05	40			
16	R22	N/A	yes	N/A	22/acre	16	0.18 (8000sq.ft.)			
17	RLD	40,000 sq.ft.	no	N/A	1/ 5 acres	0.2	10			
18	RLD	40,000 sq.ft.	no	RCA	1/ 20 acres	0.05	40			
19	RA	40,000 sq.ft.	no	N/A	1/ 20 acres	0.05	40			
20	RA	40,000 sq.ft.	no	RCA	1/ 20 acres	0.05	40			
21	R1	40,000 sq.ft.	no	IDA	1/40,000 sq.ft.	0.75	2.75 (120,000 sq.ft.)			
22	R1	40,000 sq.ft.	no	LDA	1/40,000 sq.ft.	0.75	2.75 (120,000 sq.ft.)			
23	R1	40,000 sq.ft.	yes	IDA	1/40,000 sq.ft.	0.75	2.75 (120,000 sq.ft.)			
24	R1	40,000 sq.ft.	yes	LDA	1/40,000 sq.ft.	0.75	2.75 (120,000 sq.ft.)			
25	R1	40,000 sq.ft.	yes	RCA	1/ 20 acres	0.05	40			
26	R2	15,000 sq.ft.	yes	IDA	2.5/acre	1.8	1.03 (45,000 sq.ft.)			
27	R2	15,000 sq.ft.	yes	LDA	2.5/acre	1.8	1.03 (45,000 sq.ft.)			
28	R2	20,000 sq.ft.	yes	RCA	1/ 20 acres	0.05	40			
29	R2	20,000 sq.ft.	no	IDA	1/20,000 sq.ft.	0.6	1.38 (60,000 sq.ft.)			
30	R2	20,000 sq.ft.	no	LDA	1/20,000 sq.ft.	0.6	1.38 (60,000 sq.ft.)			
31	R5	7,000 sq.ft.	yes	IDA	5/acre	2.7	0.48 (21000 sq.ft.)			
32	R5	20,000 sq.ft.	yes	RCA	1/ 20 acres	0.05	40			

Zone	Min. Lot Size	Sewer	Critical Area	Yield	Actual Yield (Units/Per Acre)
R1	40,000 sq.ft.	N/A	N/A	1/40,000 sq.ft.	0.75
R1	40,000 sq.ft.	N/A	RCA	1/40,000 sq.ft.	0.3
R2	15,000 sq.ft.	yes	N/A	2.5/acre	1.8
R2	20,000 sq.ft.	no	N/A	1/20,000 sq.ft.	0.6
R5	7,000 sq.ft.	yes	N/A	5/acre	2.7
R5	7,000 sq.ft.	yes	LDA	5/acre	2.2
R10	N/A	yes	N/A	10/acre	8.6
R15	N/A	yes	N/A	15/acre	11.5
R22	N/A	yes	N/A	22/acre	16
RLD	40,000 sq.ft.	no	N/A	1/ 5 acres	0.2
RLD	40,000 sq.ft.	no	CA	1/ 5 acres	0.1
RA	40,000 sq.ft.	no	N/A	1/ 20 acres	0.05
RA	40,000 sq.ft.	no	CA	1/ 20 acres	0.05

Key Steps in the Model:

- Apply Yield to Developable Parcels



	OBJECTID *	Shape *	PUID	OBJECTID_1	OriginalArea	totalUnits	Acres	ZONED	PFA	Shape_Length	Shape_Area
1	1	Polygon	88	2	153669.965044	1	3.527777	RA	Out	2525.291261	153669.965044
2	2	Polygon	116	3	30719.67977	1	0.705227	RA	Out	937.251307	30719.67977
3	3	Polygon	181	5	325418.340979	1	7.470577	RA	Out	2611.531429	325418.340979
4	4	Polygon	195	6	18273.45609	1	0.419501	RA	Out	1126.205661	18273.45609
5	5	Polygon	313	7	116017.124154	1	2.663387	RA	Out	2195.130153	116017.124154
6	6	Polygon	698	11	63021.760485	1	1.446781	RA	Out	1115.698795	63021.760485
7	7	Polygon	868	12	103898.729735	1	2.385187	RA	Out	1550.344059	103898.729735
8	8	Polygon	1235	14	151579.409281	2	3.479784	R2	In	1904.091887	151579.409281

Key Steps in the Model:

- Compare with Growth Forecasts and Infrastructure Capacity

		2022 Residential			Plan2040 Results			Difference		
Vacant										
	Zoned	Acreage	Units		Acreage	Units		Acreage	Units	
	RA	9,076.71	1,054		9864	1074		-787.29	-20	
	RLD	1,582.99	528		1692	507		-109.01	21	
	R1	2,564.27	1,366		2644	1412		-79.73	-46	
	R2	1,780.86	2,306		1711	2517		69.86	-211	
	R5	1,265.23	2,158		1353	2256		-87.77	-98	
	R10	276.65	817		255	808		21.65	9	
	R15	114.02	179		91	209		23.02	-30	
	R22	17.05	197		15	207		2.05	-10	
	Total	**16,677.78**	**8,605**		**17,625.00**	**8,990**		**-947.22**	**-385**	
Underutilized / Redevelopment					Plan2040 Results			Difference		
	Zoned	Acreage	Units		Acreage	Units		Acreage	Units	
	RA	5,913.61	126		4889	96		1,024.61	30	
	RLD	828.13	75		854	77		-25.87	-2	
	R1	2,373.62	847		2438	828		-64.38	19	
	R2	1,695.23	1,473		1697	1422		-1.77	51	
	R5	1,511.63	2,089		1579	2075		-67.37	14	
	R10	0.00	0		0	0		0.00	0	
	R15	0.00	0		0	0		0.00	0	
	R22	0.00	0		0	0		0.00	0	
	Total	**12,322.22**	**4,610**		**11,457.00**	**4,498**		**865.22**	**112**	
							Total Differen	**-82.00**	**-273**	
					Data copied from Tables 15 and 16, Plan2040 Volume 2					

Questions?

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