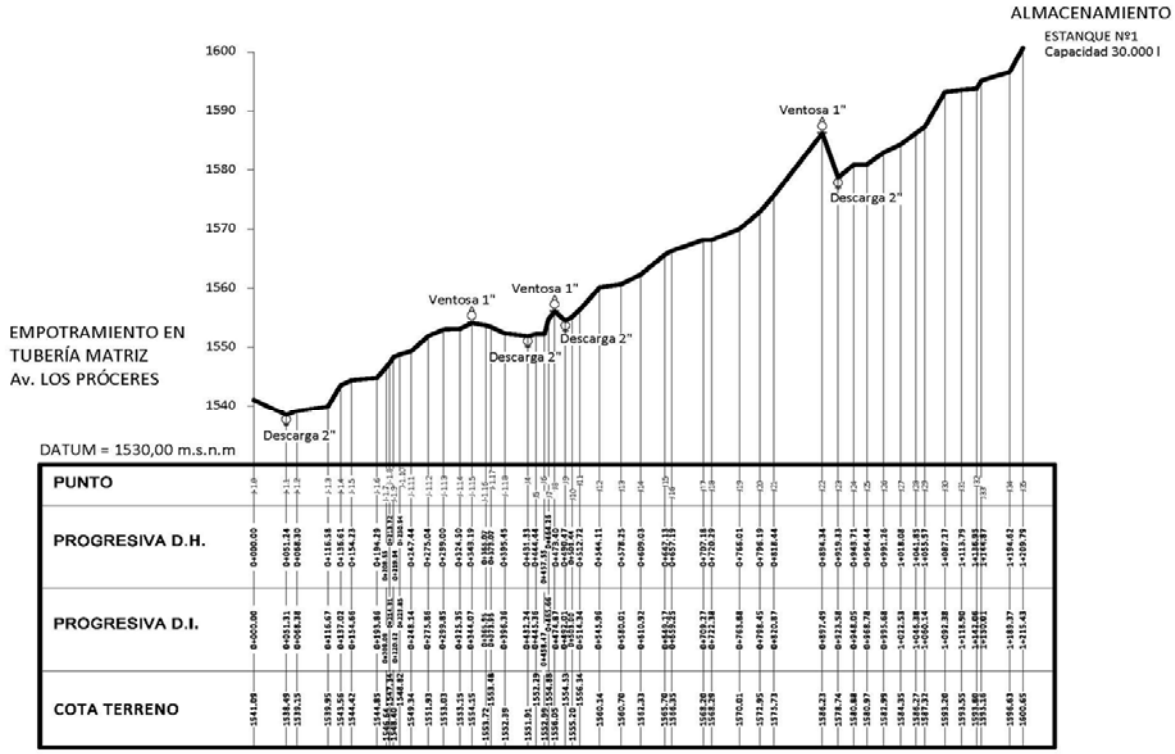
Datos:

Ejemplo: PROYECTO LINEA DE ADUCCIÓN, partiendo de una presión existente en una red urbana, se proyecta llevar el agua a un estanque para rebombeo.

Población a abastecer:	155	habitantes	**Demanda:**	250 l/p/d	Presión en la red	**120 psi**	**84.48** **m.c.a.**

PERFIL:



ESCALA V=1:100
H=1:1000

Cálculo caudal de diseño y tubería de aducción

Art 161. Norma Sanitaria 4044.

La capacidad útil del estanque bajo no será menor de las dos terceras (2/3) partes de la dotaciónd iária (D.D.) y la capacidad útil del estanque elevado no será menor de la tercera parte de dicha dotación (1/3).

Art 168. Norma Sanitaria 4044.

La tubería de aducción desde el abastecimiento público, hasta los estanques de almacenamiento deberá calcularse para suministrar el consumo total diario de la edificación en un tiempo no mayor de 4 horas.

Dotación diaria:

Nº de personas: 155

Demanda (l/p/d): 250

Dotación Diaria: Nº de personas x Demanda

Dotación Diaria (l/d): 38,750.00

Estanque de almacenamiento 1:

Capacidad: 75% de la D.D.

Capacidad: 29,063 litros ≈ **30,000 litros**

Caudal de diseño para tubería de aducción:

Tiempo de llenado: 4 horas

Q_D = 30,000 litros / 14,000 segundos = **2.14 l/s**

Q=V*A

A= ∏*(D²/4)

∏ (pi) 3.14159265

Q_D = 2.14 l/s

Ø (Pulg): 2 1/2

Area: 0.00316692 m2

V (m/s): **0.68**

C: 140

hf (m/m): 0.009

Ecuación de Hazen-Williams

expresada en función del caudal:

$hf = \alpha * L_{T1} * Q^{1,85}$ para: $\alpha = 10.674 / (C^{1,852} * D^{4,871})$

hf = pérdida de carga (m)
L = longitud de la tubería (m) en este caso se asume 1 m de longitud
D= diámetro interno (m)
Q = caudal (m^3/s)
C = coeficiente de rugosidad
α = coeficiente correspondiente al diámetro.

Tubería propuesta:

PEAD (NORMA 5), SDR 13.6 ; PE 100, 1.25; (185 psi).

Diámetro nominal: 75 mm, espesor 5.6 mm.

TABLA CÁLCULO DE LÍNEA DE ADUCCIÓN

Tramo		Prograsiva (*Dl*) (m)	Longitud parcial por tramo(m)	Clase SDR	Gasto (l/s)	Diám Ø (mm)	Area (m^2)	Velocidad (m/s)	C	α (Según tabla)	Pérdida de carga hf (m)	∑hf (m)	Elevación (cota en m)		Presión Estática (m)	Presión Dinámica (m)	Observaciones
J-1.0	J-1.1	51.31	51.31	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.147	0.15	*1541.09*	1538.49	87.08	86.93	PEAD
J-1.1	J-1.2	68.38	17.07	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.055	0.20		1539.15	86.42	86.22	PEAD
J-1.2	J-1.3	116.67	48.29	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.155	0.36		1539.95	85.62	85.26	PEAD
J-1.3	J-1.4	137.02	20.35	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.065	0.42		1543.56	82.01	81.59	PEAD
J-1.4	J-1.5	154.66	17.64	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.057	0.48		1544.42	81.15	80.67	PEAD
J-1.5	J-1.6	193.86	39.20	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.126	0.60		1544.85	80.72	80.12	PEAD
J-1.6	J-1.7	209.09	15.23	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.049	0.65		1546.64	78.93	78.28	PEAD
J-1.7	J-1.8	214.31	5.22	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.017	0.67		1547.34	78.23	77.56	PEAD
J-1.8	J-1.9	220.62	6.31	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.020	0.69		1548.40	77.17	76.48	PEAD
J-1.9	J-1.10	229.85	9.23	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.030	0.72		1548.82	76.75	76.03	PEAD
J-1.10	J-1.11	248.14	18.29	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.059	0.78		1549.34	76.23	75.45	PEAD
J-1.11	J-1.12	275.86	27.72	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.089	0.87		1551.93	73.64	72.77	PEAD
J-1.12	J-1.13	299.85	23.99	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.077	0.94		1553.03	72.54	71.60	PEAD
J-1.13	J-1.14	325.35	25.50	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.082	1.02		1553.15	72.42	71.40	PEAD
J-1.14	J-1.15	344.07	18.72	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.060	1.08		1554.15	71.42	70.34	PEAD
J-1.15	J-1.16	365.95	21.88	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.070	1.15		1553.72	71.85	70.70	PEAD
J-1.16	J-1.17	373.95	8.00	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.026	1.18		1553.48	72.09	70.91	PEAD
J-1.17	J-1.18	396.36	22.41	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.072	1.25		1552.39	73.18	71.93	PEAD
J-1.18	J-4	432.24	35.88	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.115	1.37		1551.91	73.66	72.29	PEAD
J-4	J-5	445.36	13.12	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.042	1.41		1552.29	73.28	71.87	PEAD
J-5	J-6	458.47	13.11	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.042	1.45		1552.99	72.58	71.13	PEAD
J-6	J-7	465.66	7.19	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.023	1.47		1554.88	70.69	69.22	PEAD
J-7	J-8	474.87	9.21	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.030	1.50		1556.05	69.52	68.02	PEAD
J-8	J-9	492.01	17.14	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.055	1.56		1554.53	71.04	69.48	PEAD
J-9	J-10	503.00	10.99	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.035	1.59		1555.20	70.37	68.78	PEAD
J-10	J-11	514.34	11.34	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.036	1.63		1556.34	69.23	67.60	PEAD
J-11	J-12	545.96	31.62	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.101	1.73		1560.14	65.43	63.70	PEAD
J-12	J-13	580.01	34.05	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.109	1.84		1560.70	64.87	63.03	PEAD
J-13	J-14	610.92	30.91	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.099	1.94		1562.33	63.24	61.30	PEAD
J-14	J-15	649.17	38.25	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.123	2.06		1565.70	59.87	57.81	PEAD
J-15	J-16	659.25	10.08	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.032	2.09		1566.35	59.22	57.13	PEAD
J-16	J-17	709.27	50.02	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.160	2.25		1568.20	57.37	55.12	PEAD
J-17	J-18	722.38	13.11	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.042	2.30		1568.29	57.28	54.98	PEAD
J-18	J-19	763.88	41.50	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.133	2.43		1570.01	55.56	53.13	PEAD
J-19	J-20	798.45	34.57	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.111	2.54		1572.95	52.62	50.08	PEAD
J-20	J-21	820.87	22.42	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.072	2.61		1575.73	49.84	47.23	PEAD
J-21	J-22	897.49	76.62	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.245	2.86		1586.23	39.34	36.48	PEAD
J-22	J-23	923.85	26.36	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.084	2.94		1578.74	46.83	43.89	PEAD
J-23	J-24	948.05	24.20	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.078	3.02		1580.88	44.69	41.67	PEAD
J-24	J-25	968.78	20.73	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.066	3.09		1580.97	44.60	41.51	PEAD
J-25	J-26	995.68	26.90	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.086	3.17		1582.99	42.58	39.41	PEAD
J-26	J-27	1022.53	26.85	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.086	3.26		1584.35	41.22	37.96	PEAD
J-27	J-28	1046.38	23.85	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.076	3.33		1586.27	39.30	35.97	PEAD
J-28	J-29	1060.14	13.76	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.044	3.38		1587.32	38.25	34.87	PEAD
J-29	J-30	1092.38	32.24	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.103	3.48		1593.20	32.37	28.89	PEAD
J-30	J-31	1118.90	26.52	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.085	3.57		1593.55	32.02	28.45	PEAD
J-31	J-32	1142.06	23.16	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.074	3.64		1593.80	31.77	28.13	PEAD
J-32	J-33	1150.01	7.95	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.025	3.67		1595.16	30.41	26.74	PEAD
J-33	J-34	1189.37	39.36	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.126	3.79		1596.63	28.94	25.15	PEAD
J-34	J-35	1215.43	26.06	13.6	2.14	63.8	0.0032	0.67	140	0.0006977	0.083	3.88		1600.65	24.92	21.04	PEAD