

CONSORZIO DI BONIFICA 2 PALERMO

(D.P. Reg. Sic. N.157 del 23.05.1997)

AMMODERNAMENTO RETI DI DISTRIBUZIONE COMPENSORIO JATO (I LOTTO SOLLEVATO)

PROGETTO DEFINITIVO

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RELAZIONE DEI CALCOLI IDRAULICI

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“Ammodernamento della rete irrigua dello Jato – I lotto sotto sollevamento” – Progetto Definitivo
Relazione dei calcoli idraulici

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1 PREMESSE E PARAMETRI AGRONOMICI

La presente relazione ha per oggetto la illustrazione dei criteri e delle metodologie adottate per il calcolo idraulico delle opere facenti parte del progetto, descritte nel seguente Paragrafo 2.

Per la determinazione delle portate massime transitanti nella condotta adduttrice esistente e nelle reti irrigue di progetto si è fatto riferimento ai principali parametri irrigui di seguito riportati:

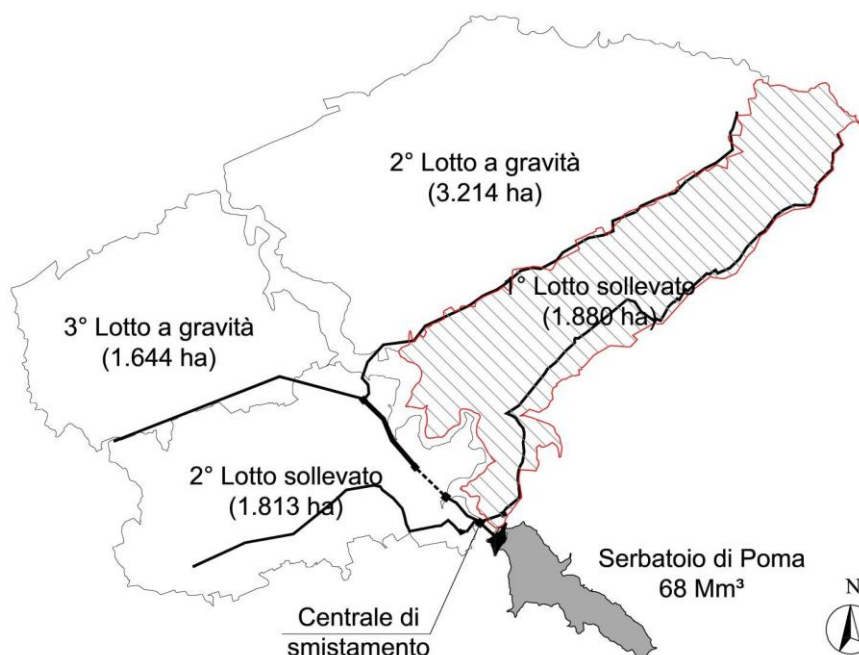
- *superficie topografica di progetto:* 1642 ha;
- *superficie irrigabile:* 1153 ha;
- *stagione irrigua teorica:* aprile÷settembre;
- *sistema di irrigazione:* aspersione;
- *prelievo:* turnato;
- *dotazione annua per ettaro irriguo:* 1.770 m³
- *dotaz. continua (d24), nel mese di punta:* 0,380 l/s ha
- *orario nominale di esercizio (Te):* ore 16;
- *orario nominale di riposo notturno (Tr):* ore 8;
- *dotaz. irrigua per un esercizio di 16 ore su 24 (d16):* 0,570 l/s ha;
- *modulo distributivo (q):* 8 l/s;
- *pressione di esercizio mi sull'idrante (p_{es}):* 0,5÷2,5 bar.

2 DESCRIZIONE DELLE OPERE DI PROGETTO

L'invaso Poma, costruito negli anni '60, e attualmente gestito dall'E.S.A., ha una superficie di 163,6 ha, con livello di regolazione a 195,6 m s.l.m., ed una capacità utile di 68 milioni di metri cubi di acqua, di cui 15 milioni destinati all'irrigazione dei circa 8.500 ha dei quattro lotti ricadenti nella piana di Partinico.

La portata prelevata dall'invaso di Poma è ripartita tra i quattro lotti che costituiscono il comprensorio dello lato (Figura 1), attraverso il manufatto di smistamento ubicato in prossimità del manufatto di restituzione degli scarichi dell'invaso, a quota nominale di 165,00 m s.l.m.

Figura 1 - Quadro di unione del compensorio lato



Tale manufatto, oltre ad alimentare la condotta che serve il 2° e 3° lotto a gravità, ospita 5 pompe (3+2R), a servizio del 1° e 3° lotto sollevato, per un totale di circa 2000 kW installati.

Il 1° lotto sollevato, oggetto della presente progettazione definitiva, è servito da due pompe che, tramite una condotta di mandata DN 800 in acciaio, sollevano la portata irrigua alla vasca di compenso di progetto ($\text{Vol} = 20.000 \text{ m}^3$ - $H = 218,50 \div 223,50 \text{ m s.l.m.}$), ubicata in Contrada Baronìa sulla destra del f. lato.

Dalla vasca ha origine la condotta di adduzione, che si sviluppa in direzione N-E per circa 11 km, con diametri decrescenti dal DN 1000 al 500, per alimentare le 31 unità irrigue elementari (comizi), numerate da 69 a 101, facenti parte lotto di progetto.

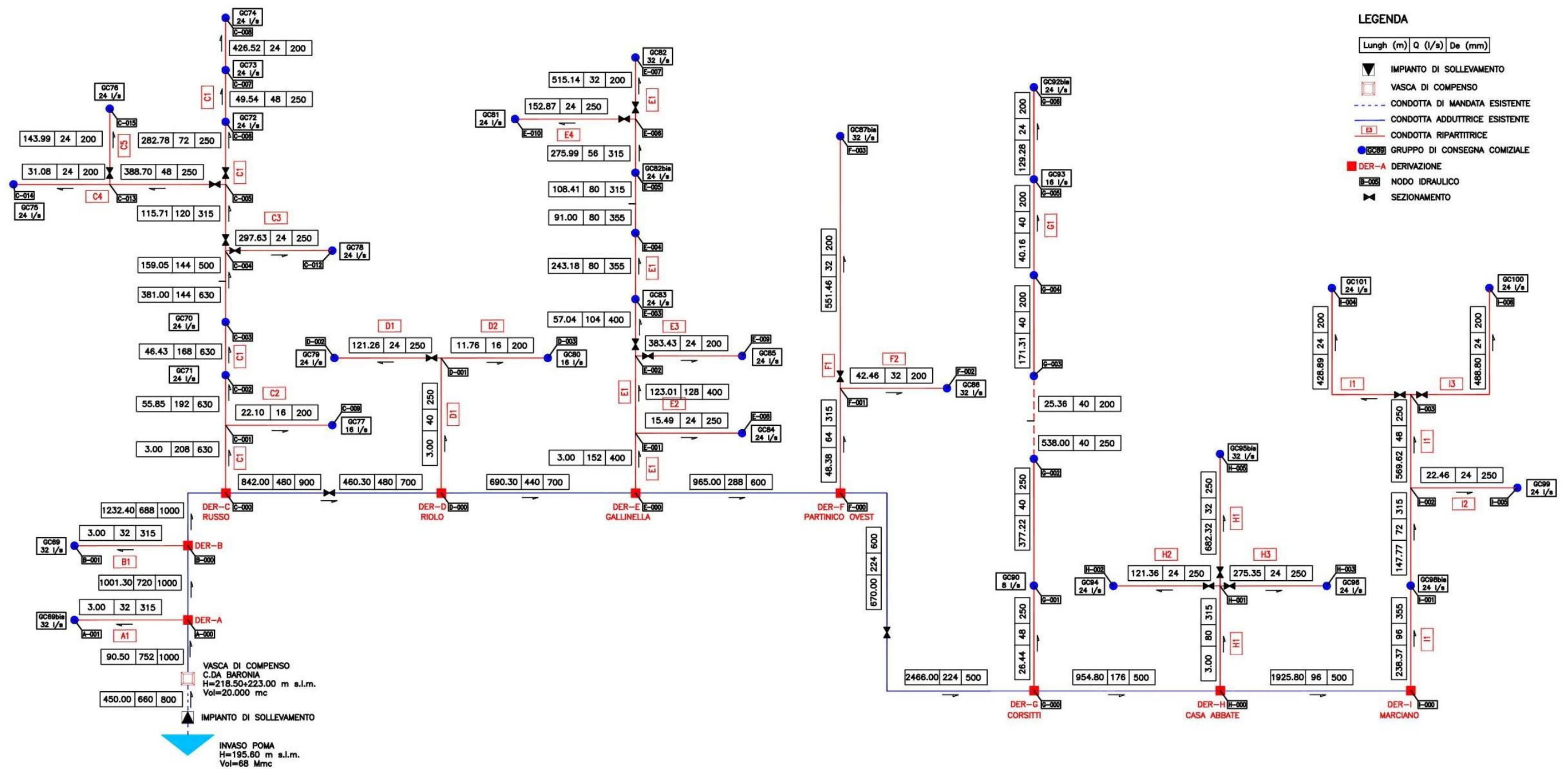
Lungo il tracciato dell'adduttore, con riferimento allo schema di Figura 2, sono ubicate 9 derivazioni (DER A-I) delle nuove condotte ripartitrici in PEAD De 630÷200 in sostituzione delle esistenti in fibro-cemento, che alimentano i manufatti di consegna previsti in testa ai singoli comizi. Le reti comiziali di progetto in PEAD, che da qui si originano, presentano uno sviluppo totale di circa 121 km e alimentano 1064 gruppi di consegna aziendali automatizzati con sistema Hydropass.

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Figura 2 - Schema idraulico di progetto



3 VASCA DI COMPENSO C.DA BARONIA

Il volume assegnato alla nuova vasca di compenso in C.da Baronia, è stato determinato in base all'ipotesi di invasare la piena portata per un tempo pari alla differenza fra l'erogazione supposta continua nelle 24 ore ed il periodo di irrigazione giornaliera di 16 ore.

Pertanto il volume di compenso nominale sarà dalla formula:

$$V_{cn} = Q_{24} \times (24 - T) \times 3,6$$

Dove:

V_{cn} è il volume di compenso nominale;

Q_{24} è la massima portata continua sulle 24 ore = 660 l/s;

T è il periodo giornaliero di irrigazione = 16 ore.

Il volume di compenso nominale di calcolo è pari a 19.008 m³, arrotondato a 20.000 m³, che garantisce una copertura di circa 8 ore di esercizio di punta in corrispondenza di assenza di alimentazione dal sollevamento e tempi più lunghi in caso di malfunzionamenti parziali.

4 VERIFICHE IDRAULICHE E DIMENSIONAMENTO DELLA RETE

4.1 Verifica idraulica della condotta adduttrice esistente

Per il dimensionamento delle condotte ripartitrici e distributrici comiziali, è stato necessario effettuare una verifica preliminare dell'adduttrice esistente, al fine di determinare i carichi idraulici in corrispondenza dei 9 nodi di derivazione da cui si originano le reti a servizio dei comizi irrigui.

La quota piezometrica di partenza per la verifica è fissata a 222,00 m s.l.m., pari al livello di regolazione medio della vasca Baronia.

La determinazione delle pressioni sui nodi di derivazione lungo è stata eseguita considerando le perdite di carico ripartite ottenute mediante la formula di Bazin, adottando un coefficiente di scabrezza pari a 0,12. Tale coefficiente tiene conto in maniera sufficientemente cautelativa anche delle eventuali perdite concentrate lungo la condotta in corrispondenza di curve o pezzi speciali.

La determinazione delle perdite di carico viene eseguita mediante la formula generale di Chezy

$$v = \chi \times \sqrt{R \times j}$$

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Che per le tubazioni si può scrivere

$$j = \beta \times \frac{Q^2}{D^5}$$

Dove:

- J rappresenta la perdita di carico unitaria;
- Q la portata di deflusso;
- D è il diametro interno della tubazione
- β è un parametro che dipende dalla scabrezza delle pareti della tubazione.

Per la stima di β si è utilizzata la formulazione di Bazin-Fantoli rappresentata dall'espressione:

$$\beta = 0,000827 \times \left(1 + \frac{2 \times \gamma}{\sqrt{D}} \right)^2$$

In Tabella 1 si riportano i risultati della verifica idraulica eseguita, che evidenziano la presenza di un modesto carico idraulico in corrispondenza delle derivazioni A, B, G, H e I.

Tabella 1 - Verifica idraulica della condotta adduttrice

PROGR.	QUOTE	DESCRIZIONE	Lungh.	Diam.	Port.	Vel.	Portata Derivata	Coeff. Scabrez	Resist. Specifica	Perdita carico	J	Quota piezom.	Altezza piezom.
(m)	(m s.m.)		(m)	(mm)	(l/s)	(m/s)	(l/s)	Y	Y(D)	(m)	(m/km)	(m s.m.)	(m)
CONDOTTA DI ADDUZIONE													
0	219.00	Vasca di carico										222	
90.50	216.50	DER-A (GC 69 bis)	90.50	1000	752	0.96	32	0.12	0.001318	0.1	0.745	221.93	5.43
1091.80	215.50	DER-B (GC 69)	1001.30	1000	720	0.92	32	0.12	0.001318	0.7	0.683	221.25	5.75
2324.20	199.00	DER-C - Ripartitrice Russo	1232.40	1000	688	0.88	208	0.12	0.001318	0.8	0.624	220.48	21.48
3166.20	201.80	Cambio diametro 900-700	842.00	900	480	0.75	0	0.12	0.002279	0.4	0.525	220.04	18.24
3626.50	194.00	DER-D - Ripartitrice Riolo	460.30	700	480	1.25	40	0.12	0.008444	0.9	1.946	219.14	25.14
4316.80	195.00	DER-E - Ripartitrice Gallinella	690.30	700	440	1.14	152	0.12	0.008444	1.1	1.635	218.01	23.01
5281.80	187.00	DER-F - Ripartitrice Partinico Ovest	965.00	600	288	1.02	64	0.12	0.018909	1.5	1.568	216.50	29.50
5951.80	206.00	Cambio diametro 600-500	670.00	600	224	0.79	0	0.12	0.018909	0.6	0.949	215.86	9.86
8417.80	197.50	DER-G - Ripartitrice Corsitti	2466.00	500	224	1.14	48	0.12	0.049199	6.1	2.469	209.78	12.28
9372.60	197.30	DER-H - Ripartitrice Casa Abbate	954.80	500	176	0.90	80	0.12	0.049199	1.5	1.524	208.32	11.02
11298.40	197.00	DER-I - Ripartitrice Marciano	1925.80	500	96	0.49	96	0.12	0.049199	0.9	0.453	207.45	10.45

5 OTTIMIZZAZIONE DELLA RETE IRRIGUA

5.1 Premesse

Il dimensionamento delle reti irrigue costituite dalle condotte ripartitrici e distributrici comiziali a valle dei nodi di derivazione ubicati lungo il tracciato dell’adduttore, è stato eseguito con l’obiettivo di individuare la distribuzione dei diametri di minimo costo in funzione del materiale (PEAD) e dei vincoli piezometrici di consegna (p_{es} sull’idrante terminale $> 5 \div 25$ m).

Con tale scopo, il calcolo dei diametri di progetto delle reti, è stato effettuato sulla base del metodo di ottimizzazione discontinua di Labye opportunamente modificato e svolto con l’ausilio di un elaboratore elettronico. La metodologia adottata è riportata nell’appendice A alla presente relazione.

Il calcolo di ottimizzazione della rete richiede, come dati di partenza per il dimensionamento, oltre alle lunghezze ed alle portate in transito nei singoli tronchi, la serie di diametri da utilizzare, con i relativi prezzi e velocità consentiti in condotta ed infine le quote piezometriche iniziali, quelle imposte nei nodi terminali in base alle pressioni richieste, nonché dei nodi intermedi particolari.

Esso fornisce, in uscita, i diametri commerciali dei diversi tronchi, le relative velocità, le pendenze piezometriche e le quote piezometriche sui diversi nodi.

Non si è imposto nell’ottimizzazione alcuna lunghezza come limite al frazionamento dei tronchi di diametro commerciale (panachage).

5.2 Tracciati

I tracciati originari delle condotte irrigue da sostituire, attraversano in alcuni casi aree che sono state oggetto, negli anni, di una continua espansione urbanistica. Per questo motivo sono stati studiati, ove necessario, percorsi alternativi in modo da limitare il più possibile le interferenze con gli edifici e le infrastrutture esistenti. Le differenze di tracciato sono evidenziate negli Elabb. E.05.

5.3 Portate

Le portate sono state dedotte per un esercizio “turnato”, secondo quanto descritto al Paragrafo 1 ed illustrato nello schema idraulico di Elab. D.05.

5.4 Velocità in condotta

L’intervallo di velocità ammissibili è stato assunto compreso tra 2,0 e 0,5 m/s.

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La velocità massima $V_{\max} = 2,0$ m/s viene fissata al fine di minimizzare le eventuali sovrappressioni di moto vario elastico conseguenti a manovre rapide sulle apparecchiature di intercettazione che in ogni caso, si mantengono al di sotto dei valori di 2 atm in accordo al noto D.M. 12-12-85 anche per manovre di chiusura veloci.

La velocità minima $V_{\min} = 0,5$ m/s viene stabilita in base ad alcune esperienze che evidenziano come, per diametri superiori ai 100 mm, detta velocità consenta alla corrente liquida di trasportare verso valle le eventuali sacche d'aria residue, che si fossero prodotte nelle condotte chiuse a causa di risalti causati da valori del numero di Froude minori di 1.

5.5 Pressioni di esercizio

La posizione della nuova vasca di compenso, le caratteristiche geometriche della condotta di adduzione esistente, nonché l'altimetria delle aree servite, costituiscono i vincoli da cui dipendono le pressioni di esercizio lungo la rete, che in pochissimi casi riescono a superare i 2 bar. In relazione al carico in corrispondenza dei nodi di derivazione (v. Tabella 1), e al massimo dislivello altimetrico delle superfici irrigue, sono state imposte pressioni sui nodi terminali dai 0,5 ai 2,5 bar. Nei casi in cui le pressioni risultassero inferiori a quelle necessarie, dovranno prevedersi pompe di rilancio. Per la valutazione del moto vario e delle sovrappressioni dovute ai moti transitori in occasione di eventuali rapide manovre di chiusura si rimanda all'Appendice C.

5.6 Diametri utilizzati e parametri di resistenza

Entrambe le reti irrigue sono costituite da tubazioni in PEAD PN10. La gamma dei diametri, con i relativi prezzi e coefficienti di scabrezza, adottati come dati di ingresso dei calcoli di ottimizzazione, sono riportati nella seguente Tabella 2.

Tabella 2 - Caratteristiche delle condotte in PEAD

De [mm]	γ (D)	Di [mm]	MATERIALE	γ_{Bazin}
630	2.46533E-08	552.2	"PEAD/PN10"	0,08
500	7.95E-08	440.6	"PEAD/PN10"	0,08
450	1.37E-07	396.6	"PEAD/PN10"	0,08
400	2.53E-07	352.6	"PEAD/PN10"	0,08
355	4.73E-07	312.8	"PEAD/PN10"	0,08
315	8.84E-07	277.6	"PEAD/PN10"	0,08
250	2.91E-06	221.2	"PEAD/PN10"	0,08
200	9.63E-06	176.2	"PEAD/PN10"	0,08
160	3.61207E-05	141	"PEAD/PN10"	0,08
140	7.37632E-05	123.4	"PEAD/PN10"	0,08
125	0.000135411	110.2	"PEAD/PN10"	0,08
110	0.000272136	96.8	"PEAD/PN10"	0,08

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5.7 Conclusioni

I risultati dei calcoli di ottimizzazione sono riassunti nella successiva Tabella 3. Il diametro medio ponderale ($DMP = \sum_i (D_i \cdot L_i) / \sum_i L_i$) per le reti a valle di ogni singola derivazione è riportato in Tabella 4.

Si rimanda all'Appendice B per i tabulati dell'ottimizzazione.

Tabella 3 - Risultati dei calcoli di ottimizzazione idraulica delle reti di progetto

Diametro (mm)	DER-A L (m)	DER-B L (m)	DER-C L (m)	DER-D L (m)	DER-E L (m)	DER-F L (m)	DER-G L (m)	DER-H L (m)	DER-I L (m)	TOTALE L (m)
630	0.00	0.00	486.28	0.00	0.00	0.00	0.00	0.00	0.00	486.28
500	0.00	0.00	159.05	0.00	0.00	0.00	0.00	0.00	0.00	159.05
400	0.00	0.00	0.00	0.00	183.05	0.00	0.00	0.00	0.00	183.05
355	0.00	0.00	0.00	0.00	334.18	0.00	0.00	0.00	238.37	572.55
315	468.53	1,562.52	115.71	0.00	384.40	48.38	0.00	3.00	147.77	2,730.31
250	1,168.45	943.29	2,560.74	462.53	3,184.13	0.00	941.66	4,019.33	1,403.46	14,683.59
200	645.81	822.40	5,406.75	2,280.07	3,939.47	4,883.71	1,604.34	3,484.75	2,697.87	25,765.17
160	227.22	540.63	11,531.93	1,920.89	6,223.98	494.31	647.85	2,222.64	5,241.62	29,051.07
140	103.95	61.30	758.04	289.63	66.23	108.00	1,177.58	796.43	701.41	4,062.57
125	768.19	310.12	2,485.81	512.94	1,959.74	1,104.56	1,218.21	1,703.46	1,734.01	11,797.04
110	2,248.35	1,835.33	10,436.29	1,628.32	9,003.14	4,147.29	1,504.50	3,247.46	7,055.15	41,105.83
TOT	5,630.50	6,075.59	33,940.60	7,094.38	25,278.32	10,786.25	7,094.14	15,477.07	19,219.66	130,596.51

Tabella 4 - DMP delle reti di progetto

	DMP [mm]
DER-A	171.05
DER-B	202.16
DER-C	163.63
DER-D	163.9
DER-E	163.67
DER-F	155.8
DER-G	161.06
DER-H	177.04
DER-I	153.56

APPENDICE A

OTTIMIZZAZIONE DEI DIAMETRI DI UNA RETE APERTA DI CONDOTTE CON IL METODO DI LABYE

1. Introduzione

La sempre maggiore diffusione del calcolo automatico ha permesso di migliorare la qualità dei progetti, sia per la soppressione di tutti i calcoli manuali, sia, soprattutto, per la possibilità, verificando il comportamento del sistema al variare di alcuni parametri, di effettuare delle scelte di base, ad esempio, a considerazioni di minimo costo.

Nella presente nota viene esposto il metodo di ottimizzazione utilizzato.

2. Descrizione generale del problema

Si prende in esame il caso di reti idrauliche con origine unica (estremo di immissione) e con vari punti di arrivo (estremi di erogazione), di tipo ramificato aperto, cioè prive di maglie chiuse. Il sistema risulta costituito da una serie di “n” tronchi caratterizzati ciascuno da: portata, diametro, lunghezza, caratteristica strutturale e costo per unità di lunghezza.

In generale, risultano noti per ogni tronco la portata “ Q_i ”, la lunghezza “ L_i ”, le quote piezometriche “ Y_0 ” del punto di origine 0 e “ Y_k ” dei punti di erogazione; sono invece da determinare i valori dei diametri da assegnare agli “n” tronchi.

In ogni tronco la perdita $\delta_i = l_i \cdot L_i$, dove $l_i = \gamma(D_i) \cdot Q_i^2$ è una funzione di resistenza del particolare diametro scelto.

Devono essere soddisfatte le m equazioni idrauliche:

$$Y_0 - Y_k = \sum \delta_i \quad [1]$$

ove la sommatoria è estesa a tutti i tronchi costituenti il percorso dall' estremo di immissione al k-esimo estremo di erogazione. Poiché si hanno in genere “n” diametri incogniti con “m” < “n” equazioni da soddisfare, per rendere determinato il problema viene introdotta l'ulteriore condizione di minimo costo del sistema. Bisogna osservare che per le reti di irrigazione per le quali la portata in ogni tronco è calcolata col criterio probabilistico dell'irrigazione “a domanda” non vale l'equazione di continuità nei nodi; senza che ciò infici lo sviluppo delle calcolazioni. Per la soluzione sono stati sviluppati vari metodi, alcuni di questi, detti appunto continui, prendono in esame in un intervallo prefissato; altri, invece, detti discontinui, prendono in esame direttamente la serie discreta dei diametri pratici (cioè disponibili in commercio).

Nel primo caso è quindi necessario, una volta risolto il problema, sostituire in ogni tronco al diametro teorico D_i i due diametri pratici D_{1i} e D_{2i} di valore immediatamente superiore ed inferiore per le lunghezze l_{i1} e l_{i2} , tali che siano soddisfatte le condizioni:

$$I_i * l_i = I_{i1} * l_{i1} + I_{i2} * l_{i2} \quad [2]$$

$$I_i = I_{i1} + I_{i2} \quad [3]$$

dove:

l_i = pendenza piezometrica relativa al diametro teorico D_i ;
 l_{i1}, l_{i2} = pendenze piezometriche relative ai diametri D_{i1} e D_{i2}

Per questo motivo, soprattutto in caso di progettazione definitiva, sono da preferirsi metodi discontinui dei quali la programmazione dinamica è quella più diffusa.

3. Programmazione dinamica

La programmazione dinamica è un metodo di ottimizzazione che permette di risolvere problemi anche complessi attraverso una serie di ottimizzazioni successive, ciascuna delle quali interessa solo una piccola parte del problema iniziale.

Nel caso di una unicursale costituita da “r” tronchi il procedimento è il seguente.

Si parte dall'estremo di valle a quota piezometrica prefissata X_r : nell'r-esimo tronco, data la portata Q , sono ammissibili una serie finita di l diametri¹ $D^1_r, \dots, D^l_r$ in base ai quali la quota piezometrica del nodo immediatamente precedente dovrà essere $X^{1}_{r-1} \dots X^l_{r-1}$ con costo del tronco corrispondente $C^1_r \dots C^l_r$; si può quindi costruire la curva $f(X_{r-1})$ del costo del tronco $X_r X_{r-1}$ in funzione della quota nel punto X_{r-1} . Analogamente per ognuna delle possibili quote piezometriche X_{r-1} si determina la quota del nodo precedente X_{r-2} ed il costo del tronco stesso. Si otterrà una serie di ammissibili quote piezometriche X_{r-2} cui saranno associati più valori del costo della rete del nodo $r-2$ all'estremo r di valle a seconda della possibile sequenza di diametri scelta: verrà associata allora ad ogni quota X minore fra tutti quelli possibili e naturalmente la corrispondente sequenza di diametri $D_r * D_{r-1}$.

Il procedimento continua fino a raggiungere il nodo di origine ed a costituire quindi la curva $f(X_o)$ che dà il costo minimo dell'intera condotta in funzione della quota piezometrica X_o nell'origine.

Una volta fissato questo ultimo valore, con un procedimento di discesa da monte verso valle, si otterranno via via i diametri ottimali per i vari tronchi e le corrispondenti quote, piezometriche nei vari nodi. Con procedimento più complesso, ma sostanzialmente analogo, si opera nel caso in cui sia presente una diramazione.

Tra gli autori che hanno applicato questo metodo alla ottimizzazione delle reti idrauliche LABYE è quello che affronta il problema nel modo più generale e completo.

¹ Per solito si considera per ogni tronco un campo di diametri relativo a velocità nelle condotte comprese tra 2÷3 e 0,5÷0,3 m/s.

In definitiva il metodo orienta ordinatamente ad introdurre i diametri che, nei vari tronchi, forniscono il maggiore risparmio di spesa nel rispetto delle condizioni idrauliche,

4. Metodo iterativo utilizzato

Il procedimento è uno sviluppo del metodo di LABYE e consiste nel determinare, per iterazioni successive, la soluzione di minimo costo.

Si esprimono le equazioni idrauliche nella forma:

$$Y_0 - Y_k = \sum_j (\delta_{j\alpha} * L_{j\alpha} + \delta_{j\beta} * L_{j\beta})^2 \quad [4]$$

$$L_j = (L_{j\alpha} + L_{j\beta}) \quad [5]$$

in quanto il generico tronco j si suppone costituito da due elementi a e b con pendenza piezometrica $l_{j\alpha}$ e $l_{j\beta}$.

Le fasi operative sono le seguenti:

- per ogni tronco si fissa inizialmente il diametro ammissibile maggiore, cioè con minor perdita di carico e maggior costo;
- con questa scelta di diametri si calcola in ogni estremo di erogazione la differenza δY_k fra la quota raggiunta Y_k e quella desiderata Y_k ;
- si sostituisce il diametro del tronco caratterizzato dal più alto rapporto $\delta C / \delta \delta$, cioè quel tronco che fa diminuire maggiormente il costo del sistema a parità di variazione di perdita di carico, con il diametro immediatamente inferiore;
- si torna al punto 2 fin quando le δY_k non risultino tutte nulle. Nel caso in cui δY_k risulti ≤ 0 , l'ultimo tronco interessato dalla sostituzione del diametro (punto c) sarà costituito da due diametri in modo da avere $\delta Y_k = 0$.

Il metodo suggerito non differisce dal metodo di Labye nel caso della semplice unicursale.

Nel caso, invece, in cui siano presenti delle diramazioni, il metodo di Labye riconduce il problema assegnato ad un equivalente problema composto da una sola unicursale: infatti, si risale da valle verso monte e, ad ogni diramazione, si sostituiscono i rami divergenti da un nodo con un unico ramo equivalente, salvo poi realizzare il processo inverso una volta trovata la soluzione ottimale per l'unica unicursale equivalente. Si ha quindi necessità di memorizzare informazioni sui vari tronchi equivalenti e sulle connessioni tra questi e i tronchi effettivi. Tutto ciò non è più necessario con il presente metodo in quanto si opera direttamente sui tronchi reali considerando separatamente le varie unicursali in cui possiamo pensare scomposta la rete e operando ora su una ora su un'altra in modo da minimizzare il costo del sistema. E' possibile

² Ove la sommatoria è estesa a tutti i tronchi costituenti il percorso dall'estremo di immissione al k-esimo estremo di erogazione.

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utilizzare il metodo proposto anche ne caso di un sollevamento iniziale, che può essere schematizzando come un tronco con perdita di carico negativa. In questo caso, si parte dalla prevalenza massima ammissibile e si procede nell'ottimizzazione, variando il diametro di una condotta o il valore della prevalenza in base ai valori dei rapporti incrementali $\delta\text{costo}/\delta\text{perdita}$ di carico.

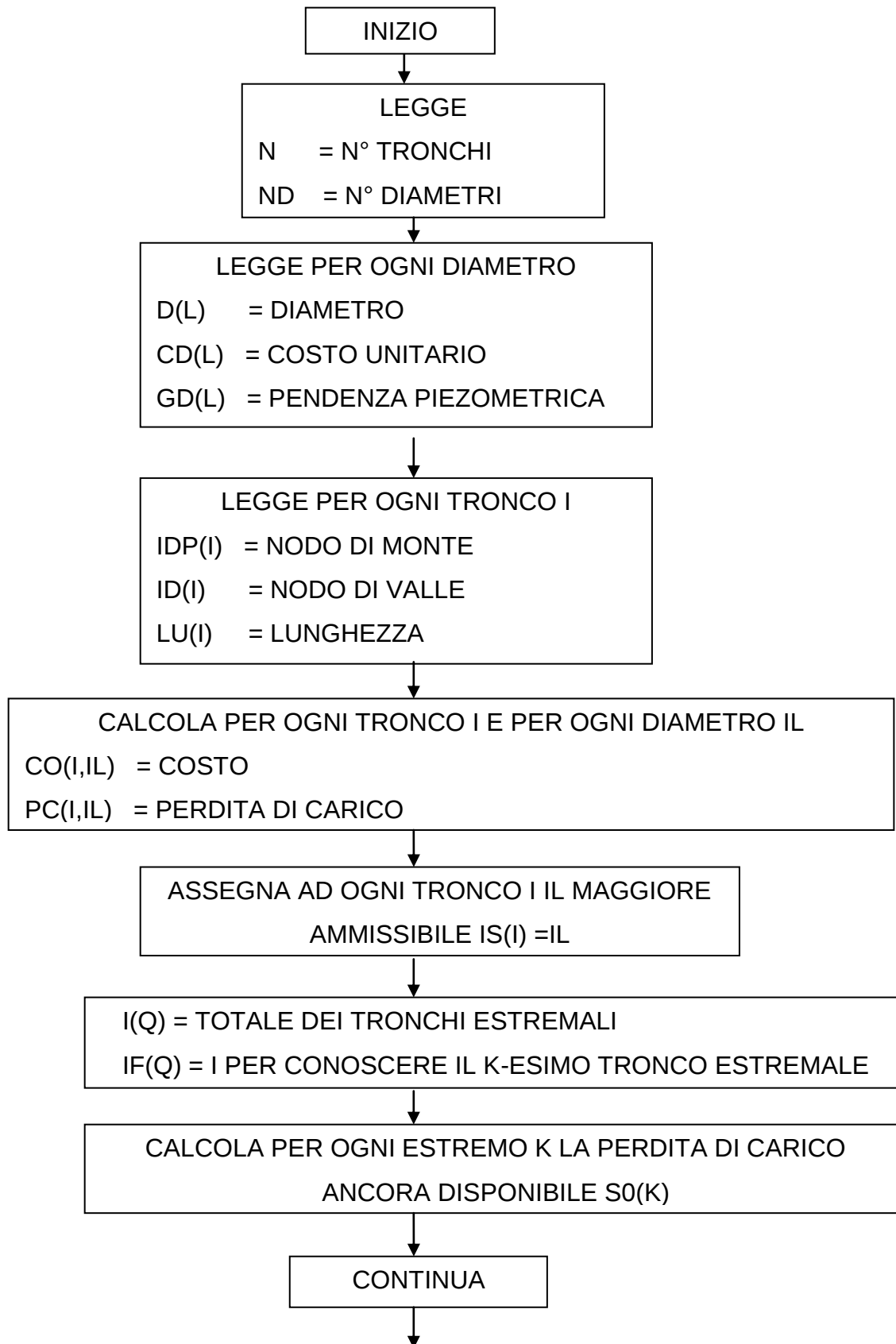
Nel caso di tronchi preesistenti (ad esempio, per le condotte di raffittimento), con diametro quindi già predeterminato, si fissano una volta per tutte i valori caratteristici quali pendenza piezometrica, perdita di carico e velocità, mentre il procedimento di ottimizzazione procede normalmente per i rimanenti tronchi.

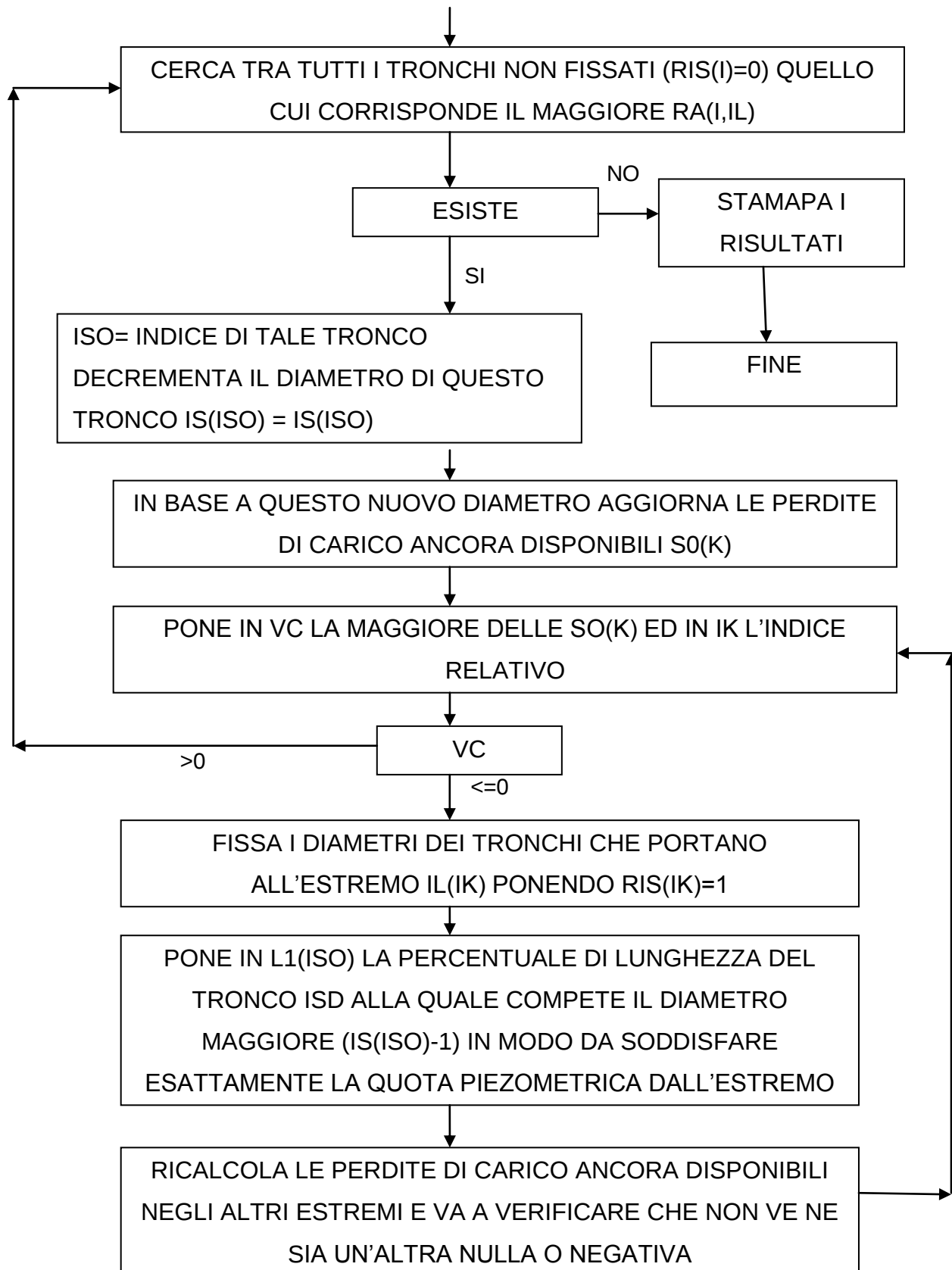
Si allegano, infine, il diagramma di flusso del programma e la descrizione dei dati che compaiono sul tabulato stampato dal calcolatore quando sono esaurite le operazioni previste dal programma.

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Diagramma di Flusso del programma





Vengono di seguito riportati i tabulati di ottimizzazione con evidenziati sia i dati di ingresso che i risultati del dimensionamento, secondo il seguente ordine:

- il tronco caratterizzato dai numeri dei nodi di monte e di valle;
- il diametro scelto in base all'ottimizzazione (mm);
- il tipo di tubazione;
- la lunghezza (m);
- la portata (l/s);
- la pendenza piezometrica (m/km);
- la velocità (m/s);
- la quota piezometrica sul nodo di monte (m s.m.);
- la quota piezometrica sul nodo di valle (m s.m.);
- la perdita di carico nel tronco (m);
- la quota piezometrica minima imposta sulle estremità terminali della rete ottenuta sommando algebricamente alla quota terreno il carico dell'idrante (m s.m.);
- la quota terreno delle estremità terminali della rete (m s.m.);
- la pressione sui nodi terminali della rete (m di acqua);
- il carico residuo sui nodi terminali della rete, ottenuto come differenza tra quota piezometrica del nodo di valle e la corrispondente quota piezometrica minima imposta (m di acqua).

E' riportato, inoltre, un riepilogo di tutti i dati dei tronchi della rete, e cioè:

- per ogni diametro, la lunghezza impiegata ed il costo corrispondente;
- il costo totale della rete;
- la lunghezza totale della rete;
- il diametro medio ponderale "DMP" della nuova rete, dato da:

$$DMP = \frac{\sum_i D_i * l_i}{\sum_i l_i}$$

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APPENDICE B

RISULTATI DEI CALCOLI DI OTTIMIZZAZIONE DELLA RETE IRRIGUA DEL 1° LOTTO SOLLEVATO

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Risultati dei calcoli di ottimizzazione della rete di distribuzione a valle della Derivazione A

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COMIZIO	NODO MONTE	NODO VALLE	DIAMETRO	LUNG.	TIPO TUBAZIONE	PORTATA	PEND. PIEZ.	VEL.	QUOTA MONTE	QUOTA VALLE	PERDITA CARICO	QUOTA IMPOSTA	QUOTA TERRENO	PRESSIONE	CARICO RESIDUO
			(mm)	(m)		(l/sec)	(m/Km)	(m/sec)	(ms.m.)	(ms.m.)	(m)	(ms.m.)	(ms.m.)	(m)	(m)
69bis	0	1	315	3	PEAD/PN10	32	0.91	0.53	221.93	221.93	0	---	---	---	---
69bis	1	2	315	2	PEAD/PN10	32	0.91	0.53	221.93	221.93	0	---	---	---	---
69bis	2	3	315	13.72	PEAD/PN10	32	0.91	0.53	221.93	221.91	0.01	---	---	---	---
69bis	3	4	200	22.99	PEAD/PN10	32	9.86	1.31	221.91	221.69	0.23	---	---	---	---
69bis	4	5	250	75.23	PEAD/PN10	32	2.98	0.83	221.69	221.46	0.22	---	---	---	---
69bis	5	6	200	15.59	PEAD/PN10	32	9.86	1.31	221.46	221.31	0.15	---	---	---	---
69bis	6	7	200	56.28	PEAD/PN10	32	9.86	1.31	221.31	220.75	0.55	---	---	---	---
69bis	7	8	200	36.1	PEAD/PN10	32	9.86	1.31	220.75	220.4	0.36	---	---	---	---
69bis	8	9	200	54.81	PEAD/PN10	32	9.86	1.31	220.4	219.86	0.54	---	---	---	---
69bis	9	10	200	68.26	PEAD/PN10	32	9.86	1.31	219.86	219.18	0.67	---	---	---	---
69bis	10	11	200	60.49	PEAD/PN10	32	9.86	1.31	219.18	218.59	0.6	---	---	---	---
69bis	11	12	200	64.78	PEAD/PN10	32	9.86	1.31	218.59	217.95	0.64	---	---	---	---
69bis	12	13	200	39.63	PEAD/PN10	32	9.86	1.31	217.95	217.56	0.39	---	---	---	---
69bis	13	14	160	56.88	PEAD/PN10	24	20.81	1.54	217.56	216.37	1.18	---	---	---	---
69bis	14	15	125	98.25	PEAD/PN10	16	34.67	1.68	216.37	212.97	3.41	---	---	---	---
69bis	15	16	110	95.26	PEAD/PN10	8	17.42	1.09	212.97	211.31	1.66	200	190	21.31	11.31
69bis	3	17	315	48	PEAD/PN10	32	0.91	0.53	221.91		0.04				
69bis	3	17	250	11.03	PEAD/PN10	32	2.98	0.83	221.87	221.84	0.03	---	---	---	---
69bis	17	18	125	50.38	PEAD/PN10	16	34.67	1.68	221.84	220.09	1.75	---	---	---	---
69bis	18	19	110	85.16	PEAD/PN10	8	17.42	1.09	220.09	218.61	1.48	211	201	17.61	7.61
69bis	18	20	110	101.98	PEAD/PN10	8	17.42	1.09	220.09	218.31	1.78	215	205	13.31	3.31
69bis	17	21	250	65.41	PEAD/PN10	32	2.98	0.83	221.84	221.64	0.19	---	---	---	---
69bis	21	22	250	120.72	PEAD/PN10	32	2.98	0.83	221.64	221.28	0.36	---	---	---	---
69bis	22	23	250	170.02	PEAD/PN10	32	2.98	0.83	221.28	220.78	0.51	---	---	---	---
69bis	23	24	200	47	PEAD/PN10	24	5.55	0.98	220.78		0.26				
69bis	23	24	160	11.12	PEAD/PN10	24	20.81	1.54	220.51	220.28	0.23	---	---	---	---
69bis	24	25	140	93.95	PEAD/PN10	16	18.88	1.34	220.28	218.51	1.77	---	---	---	---
69bis	25	26	110	82.68	PEAD/PN10	8	17.42	1.09	218.51	217.07	1.44	217	207	10.07	0.07
69bis	23	27	250	14.79	PEAD/PN10	32	2.98	0.83	220.78	220.73	0.04	---	---	---	---
69bis	27	28	250	68.69	PEAD/PN10	24	1.68	0.62	220.73	220.62	0.12	---	---	---	---
69bis	28	29	200	22.54	PEAD/PN10	16	2.47	0.66	220.62	220.56	0.06	---	---	---	---
69bis	29	30	160	26.32	PEAD/PN10	8	2.31	0.51	220.56	220.5	0.06	220.5	210.5	10	0
69bis	27	31	110	40.86	PEAD/PN10	8	17.42	1.09	220.73	220.02	0.71	220	219	1.02	0.02
69bis	28	32	110	20.5	PEAD/PN10	8	17.42	1.09	220.62	220.26	0.36	218	208	12.26	2.26
69bis	29	33	110	78.24	PEAD/PN10	8	17.42	1.09	220.56	219.2	1.36	210.5	200.5	18.7	8.7
69bis	24	34	125	33.41	PEAD/PN10	8	8.67	0.84	220.28	219.99	0.29	220	211.5	8.49	-0.01
69bis	25	35	110	21.68	PEAD/PN10	8	17.42	1.09	218.51	218.13	0.38	213	203	15.13	5.13
69bis	2	36	315	69.26	PEAD/PN10	32	0.91	0.53	221.93	221.86	0.06	---	---	---	---
69bis	36	37	315	87.08	PEAD/PN10	32	0.91	0.53	221.86	221.78	0.08	---	---	---	---
69bis	37	38	315	42.68	PEAD/PN10	32	0.91	0.53	221.78	221.75	0.04	---	---	---	---
69bis	38	39	315	112.59	PEAD/PN10	32	0.91	0.53	221.75	221.64	0.1	---	---	---	---
69bis	39	40	315	30.25	PEAD/PN10	32	0.91	0.53	221.64	221.62	0.03	---	---	---	---
69bis	40	41	315	36.46	PEAD/PN10	32	0.91	0.53	221.62	221.58	0.03	---	---	---	---
69bis	41	42	250	20.74	PEAD/PN10	32	2.98	0.83	221.58	221.52	0.06	---	---	---	---
69bis	42	43	315	23.49	PEAD/PN10	32	0.91	0.53	221.52	221.5	0.02	---	---	---	---
69bis	43	44	250	102.47	PEAD/PN10	32	2.98	0.83	221.5	221.19	0.31	---	---	---	---
69bis	44	45	250	20.68	PEAD/PN10	32	2.98	0.83	221.19	221.13	0.06	---	---	---	---
69bis	45	46	250	27.49	PEAD/PN10	32	2.98	0.83	221.13	221.05	0.08	---	---	---	---
69bis	46	47	250	51.88	PEAD/PN10	32	2.98	0.83	221.05	220.9	0.15	---	---	---	---
69bis	47	48	250	221.66	PEAD/PN10	32	2.98	0.83	220.9	220.24	0.66	---	---	---	---
69bis	48	49	250	50.07	PEAD/PN10	32	2.98	0.83	220.24	220.09	0.15	---	---	---	---
69bis	49	50	250	27.3	PEAD/PN10	32	2.98	0.83	220.09	220.01	0.08	---	---	---	---
69bis	50	51	250	28.25	PEAD/PN10	32	2.98	0.83	220.01	219.92	0.08	---	---	---	---
69bis	51	52	250	14.62	PEAD/PN10	32	2.98	0.83	219.92	219.88	0.04	---	---	---	---
69bis	52	53	250	23.5	PEAD/PN10	32	2.98	0.83	219.88	219.81	0.07	---	---	---	---
69bis	53	54	250	53.9	PEAD/PN10	32	2.98	0.83	219.81	219.65	0.16	---	---	---	---
69bis	54	55	200	43.81	PEAD/PN10	16	2.47	0.66	219.65	219.54	0.11	---	---	---	---
69bis	55	56	110	63.02	PEAD/PN10	8	17.42	1.09	219.54	218.44	1.1	218	216	2.44	0.44
69bis	4	57	110	53.71	PEAD/PN10	8	17.42	1.09	221.69	220.75	0.94	220	212.8	7.95	0.75
69bis	5	58	110	42.46	PEAD/PN10	8	17.42	1.09	221.46	220.72	0.74	218	209	11.72	2.72
69bis	6	59	125	11	PEAD/PN10	8	8.67	0.84	221.31		0.1				
69bis	6	59	110	18.03	PEAD/PN10	8	17.42	1.09	221.21	220.9	0.31	220.9	210.9	10	
69bis	7	60	110	34.7	PEAD/PN10	8	17.42	1.09	220.75	220.15	0.6	216.2	206.2	13.95	3.95
69bis	8	61	125	98.01	PEAD/PN10	16	34.67	1.68	220.4	217	3.4	---	---	---	---
69bis	61	62	110	11.69	PEAD/PN10	8	17.42	1.09	217	216.8	0.2	214.5	204.5	12.3	2.3
69bis	9	63	110	41.6	PEAD/PN10	8	17.42	1.09	219.86	219.13	0.72	216.9	206.9	12.23	2.23
69bis	10	64	110	26.19	PEAD/PN10	8	17.42	1.09	219.18	218.73	0.46	217.8	207.8	10.93	0.93
69bis	11	65	110	43.94	PEAD/PN10	8	17.42	1.09	218.59	217.82	0.77	211	201	16.82	6.82
69bis	12	66	110	32.65	PEAD/PN10	8	17.42	1.09	217.95	217.38	0.57	207	197	20.38	10.38
69bis	13	67	110	8.09	PEAD/PN10	8	17.42	1.09	217.56	217.42	0.14	204	194	23.42	13.42
69bis	15	68	110	24.81	PEAD/PN10	8	17.42	1.09	212.97	212.54	0.43	204	194	18.54	8.54
69bis	37	69	125	203.63	PEAD/PN10	16	34.67	1.68	221.78	214.73	7.06	---	---	---	---
69bis	69	70	110	21	PEAD/PN10	8	17.42	1.09	214.73	214.36	0.37	212.8	202.8	11.56	1.56

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69bis	69	71	110	34.25	PEAD/PN10	8	17.42	1.09	214.73	214.13	0.6	212.7	202.7	11.43	1.43
69bis	38	72	125	22.69	PEAD/PN10	16	34.67	1.68	221.75	220.96	0.79	218	208	12.96	2.96
69bis	39	73	110	39.76	PEAD/PN10	8	17.42	1.09	221.64	220.95	0.69	215.5	205.5	15.45	5.45
69bis	40	74	110	32.99	PEAD/PN10	8	17.42	1.09	221.62	221.04	0.57	216.7	206.7	14.34	4.34
69bis	41	75	160	21.25	PEAD/PN10	24	20.81	1.54	221.58	221.14	0.44	---	---	---	---
69bis	75	76	125	40.88	PEAD/PN10	16	34.67	1.68	221.14	219.72	1.42	---	---	---	---
69bis	76	77	110	56.15	PEAD/PN10	8	17.42	1.09	219.72	218.75	0.98	216.3	206.3	12.45	2.45
69bis	75	78	110	41.39	PEAD/PN10	8	17.42	1.09	221.14	220.42	0.72	219.2	209.2	11.22	1.22
69bis	76	79	110	38.01	PEAD/PN10	8	17.42	1.09	219.72	219.06	0.66	218	210.3	8.76	1.06
69bis	42	80	125	36.44	PEAD/PN10	16	34.67	1.68	221.52	220.26	1.26	---	---	---	---
69bis	80	81	110	99.53	PEAD/PN10	8	17.42	1.09	220.26	218.52	1.73	208.1	198.1	20.42	10.42
69bis	80	82	110	24.66	PEAD/PN10	8	17.42	1.09	220.26	219.83	0.43	215	208	11.83	4.83
69bis	43	83	110	26.75	PEAD/PN10	8	17.42	1.09	221.5	221.03	0.47	215	208.5	12.53	6.03
69bis	44	84	160	9.56	PEAD/PN10	24	20.81	1.54	221.19	221	0.2	---	---	---	---
69bis	84	85	125	56.44	PEAD/PN10	16	34.67	1.68	221	219.04	1.96	---	---	---	---
69bis	85	86	110	130.59	PEAD/PN10	8	17.42	1.09	219.04	216.76	2.27	213.2	203.2	13.56	3.56
69bis	84	87	110	27.25	PEAD/PN10	8	17.42	1.09	221	220.52	0.47	214.5	204.5	16.02	6.02
69bis	85	88	110	35.21	PEAD/PN10	8	17.42	1.09	219.04	218.43	0.61	212	202	16.43	6.43
69bis	45	89	110	26.82	PEAD/PN10	8	17.42	1.09	221.13	220.67	0.47	216	206	14.67	4.67
69bis	46	90	110	37.66	PEAD/PN10	8	17.42	1.09	221.05	220.4	0.66	214.1	204.1	16.3	6.3
69bis	46	91	200	28.14	PEAD/PN10	32	9.86	1.31	221.05	220.77	0.28	---	---	---	---
69bis	91	92	160	69.22	PEAD/PN10	24	20.81	1.54	220.77	219.33	1.44	---	---	---	---
69bis	92	93	125	35.59	PEAD/PN10	16	34.67	1.68	219.33	218.1	1.23	---	---	---	---
69bis	93	94	110	96.78	PEAD/PN10	8	17.42	1.09	218.1	216.41	1.69	211.1	201.1	15.31	5.31
69bis	91	95	110	19.54	PEAD/PN10	8	17.42	1.09	220.77	220.43	0.34	215	208.1	12.33	5.43
69bis	92	96	110	16.65	PEAD/PN10	8	17.42	1.09	219.33	219.04	0.29	215.1	205.1	13.94	3.94
69bis	93	97	110	38.79	PEAD/PN10	8	17.42	1.09	218.1	217.42	0.68	212.8	202.8	14.62	4.62
69bis	47	98	110	34.78	PEAD/PN10	8	17.42	1.09	220.9	220.29	0.61	215	208.6	11.69	5.29
69bis	47	99	110	63.65	PEAD/PN10	8	17.42	1.09	220.9	219.79	1.11	215	208.7	11.09	4.79
69bis	48	100	110	19.66	PEAD/PN10	8	17.42	1.09	220.24	219.89	0.34	215	212	7.89	4.89
69bis	49	101	125	62.68	PEAD/PN10	16	34.67	1.68	220.09	217.91	2.17	---	---	---	---
69bis	101	102	110	45.45	PEAD/PN10	8	17.42	1.09	217.91	217.12	0.79	209.4	199.4	17.72	7.72
69bis	101	103	110	13.09	PEAD/PN10	8	17.42	1.09	217.91	217.69	0.23	215	207.5	10.19	2.69
69bis	50	104	110	26.02	PEAD/PN10	8	17.42	1.09	220.01	219.55	0.45	214.5	213.5	6.05	5.05
69bis	51	105	110	22.01	PEAD/PN10	8	17.42	1.09	219.92	219.54	0.38	218	214.5	5.04	1.54
69bis	52	106	110	101.63	PEAD/PN10	8	17.42	1.09	219.88	218.11	1.77	215	206.6	11.51	3.11
69bis	53	107	110	41.52	PEAD/PN10	8	17.42	1.09	219.81	219.08	0.72	214.2	213.2	5.88	4.88
69bis	54	108	200	85.39	PEAD/PN10	24	5.55	0.98	219.65	219.17	0.47	---	---	---	---
69bis	108	109	160	17.59	PEAD/PN10	16	9.25	1.02	219.17	219.01	0.16	---	---	---	---
69bis	109	110	110	109.51	PEAD/PN10	8	17.42	1.09	219.01	217.1	1.91	208.8	198.8	18.3	8.3
69bis	109	111	140	10	PEAD/PN10	8	4.64	0.67	219.01		0.05				
69bis	109	111	125	18.79	PEAD/PN10	8	8.74	0.84	218.96	218.8	0.16	218.8	208.8	10	
69bis	55	112	160	15.28	PEAD/PN10	8	2.31	0.51	219.54	219.5	0.04	219.5	218.7	0.8	0

Consorzio di Bonifica n.2 - Palermo

“Ammodernamento della rete irrigua dello Jato – I lotto sotto sollevamento” - Progetto Definitivo
Relazione dei calcoli idraulici

Risultati dei calcoli di ottimizzazione della rete di distribuzione a valle della Derivazione B

Consorzio di Bonifica n.2 - Palermo

"Ammodernamento della rete irrigua dello Jato – I lotto sotto sollevamento" - Progetto Definitivo
Relazione dei calcoli idraulici

COMIZIO	NODO MONTE	NODO VALLE	DIAMETRO (mm)	LUNG. (m)	TIPO TUBAZIONE	PORTATA (l/sec)	PEND. PIEZ. (m/Km)	VEL. (m/sec)	QUOTA MONTE (ms.m.)	QUOTA VALLE (ms.m.)	PERDITA CARICO (m)	QUOTA IMPOSTA (ms.m.)	QUOTA TERRENO (ms.m.)	PRESSIONE (m)	CARICO RESIDUO (m)
69	0	1	315	3	PEAD/PN10	32	0.91	0.53	221.25	221.25	0	---	---	---	---
69	1	2	315	2	PEAD/PN10	32	0.91	0.53	221.25	221.25	0	---	---	---	---
69	2	3	315	84.11	PEAD/PN10	32	0.91	0.53	221.25	221.17	0.08	---	---	---	---
69	3	4	315	142.82	PEAD/PN10	32	0.91	0.53	221.17	221.04	0.13	---	---	---	---
69	4	5	315	136.07	PEAD/PN10	32	0.91	0.53	221.04	220.92	0.12	---	---	---	---
69	5	6	315	194.38	PEAD/PN10	32	0.91	0.53	220.92	220.74	0.18	---	---	---	---
69	6	7	315	82.54	PEAD/PN10	32	0.91	0.53	220.74	220.67	0.07	---	---	---	---
69	7	8	315	149.3	PEAD/PN10	32	0.91	0.53	220.67	220.53	0.14	---	---	---	---
69	8	9	315	76.91	PEAD/PN10	32	0.91	0.53	220.53	220.46	0.07	---	---	---	---
69	9	10	315	33.85	PEAD/PN10	32	0.91	0.53	220.46	220.43	0.03	---	---	---	---
69	10	11	315	46.11	PEAD/PN10	32	0.91	0.53	220.43	220.39	0.04	---	---	---	---
69	11	12	315	26.81	PEAD/PN10	32	0.91	0.53	220.39	220.36	0.02	---	---	---	---
69	12	13	315	59.11	PEAD/PN10	32	0.91	0.53	220.36	220.31	0.05	---	---	---	---
69	13	14	315	77.94	PEAD/PN10	32	0.91	0.53	220.31	220.24	0.07	---	---	---	---
69	14	15	315	101.4	PEAD/PN10	32	0.91	0.53	220.24	220.15	0.09	---	---	---	---
69	15	16	315	215.45	PEAD/PN10	32	0.91	0.53	220.15	219.95	0.2	---	---	---	---
69	16	17	315	80	PEAD/PN10	32	0.9	0.53	219.95		0.07	---	---	---	---
69	16	17	250	9.94	PEAD/PN10	32	3	0.83	219.88	219.85	0.03	---	---	---	---
69	17	18	250	145.48	PEAD/PN10	32	2.98	0.83	219.85	219.42	0.43	---	---	---	---
69	18	19	250	55.71	PEAD/PN10	32	2.98	0.83	219.42	219.25	0.17	---	---	---	---
69	19	20	250	42	PEAD/PN10	32	2.98	0.83	219.25	219.13	0.13	---	---	---	---
69	20	21	250	122.62	PEAD/PN10	32	2.98	0.83	219.13	218.76	0.37	---	---	---	---
69	21	22	250	62.7	PEAD/PN10	32	2.98	0.83	218.76	218.57	0.19	---	---	---	---
69	22	23	250	64.78	PEAD/PN10	32	2.98	0.83	218.57	218.38	0.19	---	---	---	---
69	23	24	250	82.24	PEAD/PN10	32	2.98	0.83	218.38	218.14	0.25	---	---	---	---
69	24	25	200	111.1	PEAD/PN10	32	9.86	1.31	218.14	217.04	1.1	---	---	---	---
69	25	26	200	143.47	PEAD/PN10	32	9.86	1.31	217.04	215.63	1.41	---	---	---	---
69	26	27	200	81.96	PEAD/PN10	32	9.86	1.31	215.63	214.82	0.81	---	---	---	---
69	27	28	200	25	PEAD/PN10	24	5.55	0.98	214.82		0.14	---	---	---	---
69	27	28	160	41.03	PEAD/PN10	24	20.81	1.54	214.68	213.83	0.85	---	---	---	---
69	28	29	160	66.02	PEAD/PN10	16	9.25	1.02	213.83	213.22	0.61	---	---	---	---
69	29	30	110	33.48	PEAD/PN10	8	17.42	1.09	213.22	212.63	0.58	207.8	197.8	14.83	4.83
69	3	31	110	57.16	PEAD/PN10	8	17.42	1.09	221.17	220.17	1	219.5	213.5	6.67	0.67
69	4	32	160	40	PEAD/PN10	8	2.31	0.51	221.04		0.09	---	---	---	---
69	4	32	140	10.28	PEAD/PN10	8	4.72	0.67	220.95	220.9	0.05	220.9	220.4	0.5	---
69	5	33	110	24.59	PEAD/PN10	8	17.42	1.09	220.92	220.49	0.43	209	211.6	8.89	11.49
69	7	34	110	120.65	PEAD/PN10	8	17.42	1.09	220.67	218.56	2.1	217.6	207.6	10.96	0.96
69	8	35	110	69.85	PEAD/PN10	8	17.42	1.09	220.53	219.31	1.22	214.3	204.3	15.01	5.01
69	9	36	110	62.05	PEAD/PN10	8	17.42	1.09	220.46	219.38	1.08	217.3	207.3	12.08	2.08
69	10	37	110	49.61	PEAD/PN10	8	17.42	1.09	220.43	219.57	0.86	219	210.5	9.07	0.57
69	11	38	110	41.44	PEAD/PN10	8	17.42	1.09	220.39	219.67	0.72	219	212.5	7.17	0.67
69	12	39	110	54.15	PEAD/PN10	8	17.42	1.09	220.36	219.42	0.94	214.3	204.3	15.12	5.12
69	13	40	110	70.45	PEAD/PN10	8	17.42	1.09	220.31	219.08	1.23	211	201	18.08	8.08
69	15	41	125	39.95	PEAD/PN10	8	8.67	0.84	220.15	219.8	0.35	219.5	214.5	5.3	0.3
69	17	42	110	43.65	PEAD/PN10	8	17.42	1.09	219.85	219.09	0.76	209.3	199.3	19.79	9.79
69	18	43	110	51.4	PEAD/PN10	8	17.42	1.09	219.42	218.52	0.9	218	216.7	1.82	0.52
69	19	44	110	39.17	PEAD/PN10	8	17.42	1.09	219.25	218.57	0.68	218	214.6	3.97	0.57
69	20	45	160	54.98	PEAD/PN10	8	2.31	0.51	219.13	219	0.13	219	213.2	5.8	0
69	21	46	110	62.38	PEAD/PN10	8	17.42	1.09	218.76	217.68	1.09	216.3	206.3	11.38	1.38
69	22	47	125	40	PEAD/PN10	8	8.67	0.84	218.57		0.35	---	---	---	---
69	22	47	110	24.67	PEAD/PN10	8	17.42	1.09	218.23	217.8	0.43	217.8	207.8	10	---
69	23	48	110	55.88	PEAD/PN10	8	17.42	1.09	218.38	217.41	0.97	216	206	11.41	1.41
69	24	49	160	30	PEAD/PN10	8	2.31	0.51	218.14		0.07	---	---	---	---
69	24	49	140	14.53	PEAD/PN10	8	4.72	0.67	218.07	218	0.07	218	210.3	7.7	---
69	25	50	125	25	PEAD/PN10	8	8.67	0.84	217.04		0.22	---	---	---	---
69	25	50	110	18.64	PEAD/PN10	8	17.42	1.09	216.82	216.5	0.32	216.5	206.5	10	---
69	27	51	110	58.15	PEAD/PN10	8	17.42	1.09	214.82	213.81	1.01	206.8	196.8	17.01	7.01
69	28	52	110	43.86	PEAD/PN10	8	17.42	1.09	213.83	213.06	0.76	204.7	194.7	18.36	8.36
69	29	53	125	48.36	PEAD/PN10	8	8.67	0.84	213.22	212.8	0.42	212.8	202.8	10	0
69	2	54	315	41.72	PEAD/PN10	32	0.91	0.53	221.25	221.21	0.04	---	---	---	---
69	54	55	315	9	PEAD/PN10	32	0.91	0.53	221.21		0.01	---	---	---	---
69	54	55	250	95.92	PEAD/PN10	32	2.98	0.83	221.2	220.91	0.29	---	---	---	---
69	55	56	250	47.18	PEAD/PN10	32	2.98	0.83	220.91	220.77	0.14	---	---	---	---
69	56	57	250	35.01	PEAD/PN10	32	2.98	0.83	220.77	220.67	0.1	---	---	---	---
69	57	58	250	64.83	PEAD/PN10	32	2.98	0.83	220.67	220.48	0.19	---	---	---	---
69	58	59	250	42.1	PEAD/PN10	32	2.98	0.83	220.48	220.35	0.13	---	---	---	---
69	59	60	250	35.67	PEAD/PN10	32	2.98	0.83	220.35	220.24	0.11	---	---	---	---
69	60	61	250	37.11	PEAD/PN10	32	2.98	0.83	220.24	220.13	0.11	---	---	---	---
69	61	62	200	8.55	PEAD/PN10	32	9.86	1.31	220.13	220.05	0.08	---	---	---	---
69	62	63	200	133.55	PEAD/PN10	32	9.86	1.31	220.05	218.73	1.32	---	---	---	---
69	63	64	200	26.39	PEAD/PN10	32	9.86	1.31	218.73	218.47	0.26	---	---	---	---
69	64	65	200	52	PEAD/PN10	24	5.55	0.98	218.47		0.29	---	---	---	---
69	64	65	160	11.1	PEAD/PN10	24	20.81	1.54	218.18	217.95	0.23	---	---	---	---
69	65	66	160	16.79	PEAD/PN10	16	9.25	1.02	217.95	217.8	0.16	---	---	---	---
69	66	67	125	34.33	PEAD/PN10	8	8.67	0.84	217.8	217.5	0.3	217.5	207.5	10	0
69	59	68	200	131.68	PEAD/PN10	32	9.86	1.31	220.35	219.05	1.3	---	---	---	---
69	68	69	200	39.09	PEAD/PN10	32	9.86	1.31	219.05	218.67	0.39	---	---	---	---
69	69	70	200	56.22	PEAD/PN10	32	9.86	1.31	218.67	218.09	0.57	---	---	---	---

Consorzio di Bonifica n.2 - Palermo

“Ammodernamento della rete irrigua dello Jato – I lotto sotto sollevamento” - Progetto Definitivo

Relazione dei calcoli idraulici

69	70	71	200	11.39	PEAD/PN10	32	9.86	1.31	218.09	217.98	0.11	---	---	---	---
69	71	72	160	129.55	PEAD/PN10	24	20.81	1.54	217.98	215.28	2.7	---	---	---	---
69	72	73	125	31.48	PEAD/PN10	16	34.67	1.68	215.28	214.19	1.09	---	---	---	---
69	73	74	110	59.17	PEAD/PN10	8	17.42	1.09	214.19	213.16	1.03	190	160	53.16	23.16
69	55	75	110	60.05	PEAD/PN10	8	17.42	1.09	220.91	219.87	1.05	219.5	209.5	10.37	0.37
69	56	76	125	28	PEAD/PN10	8	8.67	0.84	220.77		0.24				
69	56	76	110	30.54	PEAD/PN10	8	17.42	1.09	220.53	220	0.53	220	214	6	
69	60	77	160	31	PEAD/PN10	8	2.31	0.51	220.24		0.07				
69	60	77	140	36.49	PEAD/PN10	8	4.72	0.67	220.17	220	0.17	220	211.2	8.8	
69	61	78	160	57.67	PEAD/PN10	8	2.31	0.51	220.13	220	0.13	220	213.6	6.4	0
69	63	79	160	62.49	PEAD/PN10	24	20.81	1.54	218.73	217.43	1.3	---	---	---	---
69	79	80	125	63	PEAD/PN10	16	34.67	1.68	217.43	215.25	2.18	---	---	---	---
69	80	81	110	98.17	PEAD/PN10	8	17.42	1.09	215.25	213.54	1.71	209.3	199.3	14.24	4.24
69	79	82	110	54.22	PEAD/PN10	8	17.42	1.09	217.43	216.49	0.94	214.7	204.7	11.79	1.79
69	80	83	110	58.83	PEAD/PN10	8	17.42	1.09	215.25	214.22	1.02	211	201	13.22	3.22
69	64	84	110	110.08	PEAD/PN10	8	17.42	1.09	218.47	216.55	1.92	209.6	199.6	16.95	6.95
69	65	85	110	62.53	PEAD/PN10	8	17.42	1.09	217.95	216.86	1.09	209.7	199.7	17.16	7.16
69	66	86	110	44.51	PEAD/PN10	8	17.42	1.09	217.8	217.02	0.78	213.9	203.9	13.12	3.12
69	68	87	110	33.91	PEAD/PN10	8	17.42	1.09	219.05	218.46	0.59	204.6	194.6	23.86	13.86
69	69	88	110	32.34	PEAD/PN10	8	17.42	1.09	218.67	218.1	0.56	196.7	186.7	31.4	21.4
69	70	89	110	39.31	PEAD/PN10	8	17.42	1.09	218.09	217.41	0.68	183.3	173.3	44.11	34.11
69	71	90	110	61.81	PEAD/PN10	8	17.42	1.09	217.98	216.9	1.08	191.7	166.7	50.2	25.2
69	72	91	110	34.73	PEAD/PN10	8	17.42	1.09	215.28	214.68	0.6	189.3	164.3	50.38	25.38

Consorzio di Bonifica n.2 - Palermo

“Ammodernamento della rete irrigua dello Jato – I lotto sotto sollevamento” - Progetto Definitivo
Relazione dei calcoli idraulici

Risultati dei calcoli di ottimizzazione della rete di distribuzione a valle della Derivazione C

Consorzio di Bonifica n.2 - Palermo

"Ammodernamento della rete irrigua dello Jato – I lotto sotto sollevamento" - Progetto Definitivo
Relazione dei calcoli idraulici

COMIZIO	NODO MONTE	NODO VALLE	DIAMETRO	LUNG.	TIPO TUBAZIONE	PORTATA	PEND. PIEZ.	VEL.	QUOTA MONTE	QUOTA VALLE	PERDITA CARICO	QUOTA IMPOSTA	QUOTA TERRENO	PRESSIONE	CARICO RESIDUO
			(mm)	(m)		(l/sec)	(m/Km)	(m/sec)	(ms.m.)	(ms.m.)	(m)	(ms.m.)	(ms.m.)	(m)	(m)
RIP-C1	0	1	630	3	PEAD/PN10	208	1.07	0.87	220.48	220.48	0	---	---	---	---
RIP-C1	1	2	630	55.85	PEAD/PN10	192	0.91	0.8	220.48	220.43	0.05	---	---	---	---
RIP-C1	2	3	630	46.43	PEAD/PN10	168	0.7	0.7	220.43	220.39	0.03	---	---	---	---
RIP-C1	3	4	630	381	PEAD/PN10	144	0.51	0.6	220.39		0.19				
RIP-C1	3	4	500	159.05	PEAD/PN10	144	1.65	0.94	220.2	219.94	0.26	---	---	---	---
RIP-C1	4	5	315	115.71	PEAD/PN10	120	12.73	1.98	219.94	218.46	1.47	---	---	---	---
RIP-C1	5	6	250	282.78	PEAD/PN10	72	15.09	1.87	218.46	214.2	4.27	---	---	---	---
RIP-C1	6	7	250	49.54	PEAD/PN10	48	6.7	1.25	214.2	213.87	0.33	---	---	---	---
RIP-C1	7	8	200	426.52	PEAD/PN10	24	5.55	0.98	213.87	211.5	2.37	---	---	---	---
RIP-C2	1	9	200	22.1	PEAD/PN10	16	2.47	0.66	220.48	220.42	0.05	---	---	---	---
71	2	10	250	3	PEAD/PN10	24	1.68	0.62	220.43	220.42	0.01	---	---	---	---
70	3	11	250	3	PEAD/PN10	24	1.68	0.62	220.39	220.39	0.01	---	---	---	---
RIP-C3	4	12	250	297.63	PEAD/PN10	24	1.68	0.62	219.94	219.44	0.5	---	---	---	---
RIP-C4	5	13	250	388.7	PEAD/PN10	48	6.7	1.25	218.46	215.86	2.61	---	---	---	---
RIP-C4	13	14	200	31.08	PEAD/PN10	24	5.55	0.98	215.86	215.68	0.17	---	---	---	---
RIP-C5	13	15	200	143.99	PEAD/PN10	24	5.55	0.98	215.86	215.06	0.8	---	---	---	---
77	6	16	200	3	PEAD/PN10	24	5.55	0.98	214.2	214.18	0.02	---	---	---	---
77	7	17	200	3	PEAD/PN10	24	5.55	0.98	213.87	213.85	0.02	---	---	---	---
77	8	18	200	3	PEAD/PN10	24	5.55	0.98	211.5	211.48	0.02	---	---	---	---
77	9	19	200	2	PEAD/PN10	16	2.47	0.66	220.42	220.42	0	---	---	---	---
77	19	20	200	104.72	PEAD/PN10	16	2.47	0.66	220.42	220.16	0.26	---	---	---	---
77	20	21	200	87.42	PEAD/PN10	16	2.47	0.66	220.16	219.94	0.22	---	---	---	---
77	21	22	200	100.81	PEAD/PN10	16	2.47	0.66	219.94	219.7	0.25	---	---	---	---
77	22	23	200	19.51	PEAD/PN10	16	2.47	0.66	219.7	219.65	0.05	---	---	---	---
77	23	24	200	65.09	PEAD/PN10	16	2.47	0.66	219.65	219.49	0.16	---	---	---	---
77	24	25	200	49.11	PEAD/PN10	16	2.47	0.66	219.49	219.37	0.12	---	---	---	---
77	25	26	200	79.53	PEAD/PN10	16	2.47	0.66	219.37	219.17	0.2	---	---	---	---
77	26	27	200	244.29	PEAD/PN10	16	2.47	0.66	219.17	218.57	0.6	---	---	---	---
77	27	28	200	102.91	PEAD/PN10	16	2.47	0.66	218.57	218.31	0.25	---	---	---	---
77	28	29	200	44.49	PEAD/PN10	16	2.47	0.66	218.31	218.2	0.11	---	---	---	---
77	29	30	200	46.98	PEAD/PN10	16	2.47	0.66	218.2	218.09	0.12	---	---	---	---
77	30	31	200	163.27	PEAD/PN10	16	2.47	0.66	218.09	217.69	0.4	---	---	---	---
77	31	32	200	37.38	PEAD/PN10	16	2.47	0.66	217.69	217.59	0.09	---	---	---	---
77	32	33	200	87.18	PEAD/PN10	16	2.47	0.66	217.59	217.38	0.21	---	---	---	---
77	33	34	200	46.23	PEAD/PN10	16	2.47	0.66	217.38	217.26	0.11	---	---	---	---
77	34	35	200	54.75	PEAD/PN10	16	2.47	0.66	217.26	217.13	0.13	---	---	---	---
77	35	36	200	99.43	PEAD/PN10	16	2.47	0.66	217.13	216.88	0.25	---	---	---	---
77	36	37	200	29	PEAD/PN10	16	2.47	0.66	216.88		0.07				
77	36	37	160	46.39	PEAD/PN10	16	9.25	1.02	216.81	216.38	0.43	---	---	---	---
77	37	38	160	103.05	PEAD/PN10	16	9.25	1.02	216.38	215.43	0.95	---	---	---	---
77	38	39	160	187.5	PEAD/PN10	8	2.31	0.51	215.43	215	0.43	215	197.7	17.3	0
77	21	40	110	18.69	PEAD/PN10	8	17.42	1.09	219.94	219.62	0.33	218.4	198.4	21.22	1.22
77	22	41	125	49	PEAD/PN10	8	8.58	0.84	219.7		0.42				
77	22	41	110	15.3	PEAD/PN10	8	17.94	1.09	219.27	219	0.27	219	207.5	11.5	
77	24	42	125	30.47	PEAD/PN10	8	8.67	0.84	219.49	219.22	0.26	219	204.6	14.62	0.22
77	25	43	125	36.77	PEAD/PN10	8	8.67	0.84	219.37	219.05	0.32	219	205	14.05	0.05
77	26	44	125	14.03	PEAD/PN10	8	8.67	0.84	219.17	219.05	0.12	219	207	12.05	0.05
77	27	45	200	44	PEAD/PN10	16	2.46	0.66	218.57		0.11				
77	27	45	160	137.37	PEAD/PN10	16	9.26	1.02	218.46	217.19	1.27	---	---	---	---
77	45	46	160	81.08	PEAD/PN10	8	2.31	0.51	217.19	217	0.19	217	198.9	18.1	---
77	29	47	110	12.96	PEAD/PN10	8	17.42	1.09	218.2	217.98	0.23	217	205.6	12.38	0.98
77	30	48	110	29	PEAD/PN10	8	17.42	1.09	218.09	217.58	0.51	217	203.7	13.88	0.58
77	31	49	200	33	PEAD/PN10	16	2.47	0.66	217.69		0.08				
77	31	49	160	59.49	PEAD/PN10	16	9.25	1.02	217.6	217.05	0.55	---	---	---	---
77	49	50	160	24.48	PEAD/PN10	8	2.31	0.51	217.05	217	0.06	217	202.1	14.9	0
77	49	51	140	134	PEAD/PN10	8	4.71	0.67	217.05		0.63				
77	49	51	125	164.12	PEAD/PN10	8	8.69	0.84	216.42	215	1.43	215	200.5	14.5	
77	34	52	110	117.93	PEAD/PN10	8	17.42	1.09	217.26	215.21	2.05	215	205.3	9.91	0.21
77	35	53	110	12.53	PEAD/PN10	8	17.42	1.09	217.13	216.91	0.22	215	205.6	11.31	1.91
77	36	54	110	18.79	PEAD/PN10	8	17.42	1.09	216.88	216.56	0.33	215	205.6	10.96	1.56
77	37	55	110	33.58	PEAD/PN10	8	17.42	1.09	216.38	215.8	0.58	215	205.5	10.3	0.8
71	10	56	250	2	PEAD/PN10	24	1.68	0.62	220.42	220.42	0	---	---	---	---
71	56	57	110	18.36	PEAD/PN10	8	17.42	1.09	220.42	220.1	0.32	213	193	27.1	7.1
71	56	58	250	23.02	PEAD/PN10	24	1.68	0.62	220.42	220.38	0.04	---	---	---	---
71	58	59	250	37.16	PEAD/PN10	24	1.68	0.62	220.38	220.32	0.06	---	---	---	---
71	59	60	250	26.29	PEAD/PN10	24	1.68	0.62	220.32	220.27	0.04	---	---	---	---
71	60	61	250	57.39	PEAD/PN10	24	1.68	0.62	220.27	220.18	0.1	---	---	---	---
71	61	62	250	71.16	PEAD/PN10	24	1.68	0.62	220.18	220.06	0.12	---	---	---	---
71	62	63	250	59.34	PEAD/PN10	24	1.68	0.62	220.06	219.96	0.1	---	---	---	---
71	63	64	250	47.68	PEAD/PN10	24	1.68	0.62	219.96	219.88	0.08	---	---	---	---
71	64	65	250	65.34	PEAD/PN10	24	1.68	0.62	219.88	219.77	0.11	---	---	---	---
71	65	66	250	129.28	PEAD/PN10	24	1.68	0.62	219.77	219.55	0.22	---	---	---	---
71	66	67	250	14	PEAD/PN10	24	1.68	0.62	219.55		0.02				

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71	66	67	200	34.1	PEAD/PN10	24	5.55	0.98	219.53	219.34	0.19	---	---	---	---
71	67	68	200	100.67	PEAD/PN10	16	2.47	0.66	219.34	219.09	0.25	---	---	---	---
71	68	69	160	83.22	PEAD/PN10	8	2.31	0.51	219.09	218.9	0.19	218.9	198.9	20	0
71	58	70	110	18.17	PEAD/PN10	8	17.42	1.09	220.38	220.06	0.32	209.7	189.7	30.36	10.36
71	60	71	110	33.39	PEAD/PN10	8	17.42	1.09	220.27	219.69	0.58	211.3	191.3	28.39	8.39
71	61	72	110	62.73	PEAD/PN10	8	17.42	1.09	220.18	219.08	1.09	217.7	197.7	21.38	1.38
71	64	73	110	93.9	PEAD/PN10	8	17.42	1.09	219.88	218.24	1.64	218.2	198.2	20.04	0.04
71	65	74	125	12	PEAD/PN10	8	8.42	0.84	219.77		0.1				
71	65	74	110	32.23	PEAD/PN10	8	17.6	1.09	219.67	219.1	0.57	219.1	199.1	20	
71	67	75	110	37.9	PEAD/PN10	8	17.42	1.09	219.34	218.68	0.66	218	200.9	17.78	0.68
71	68	76	110	33.66	PEAD/PN10	8	17.42	1.09	219.09	218.5	0.59	218	200.8	17.7	0.5
71	59	77	250	60.82	PEAD/PN10	24	1.68	0.62	220.32	220.21	0.1	---	---	---	---
71	77	78	200	49.75	PEAD/PN10	24	5.55	0.98	220.21	219.94	0.28	---	---	---	---
71	78	79	200	63.41	PEAD/PN10	24	5.55	0.98	219.94	219.59	0.35	---	---	---	---
71	79	80	200	28.62	PEAD/PN10	24	5.55	0.98	219.59	219.43	0.16	---	---	---	---
71	80	81	200	55.47	PEAD/PN10	24	5.55	0.98	219.43	219.12	0.31	---	---	---	---
71	81	82	200	33.7	PEAD/PN10	24	5.55	0.98	219.12	218.93	0.19	---	---	---	---
71	82	83	200	73.54	PEAD/PN10	24	5.55	0.98	218.93	218.53	0.41	---	---	---	---
71	83	84	200	27	PEAD/PN10	24	5.47	0.98	218.53		0.15				
71	83	84	160	16.65	PEAD/PN10	24	21.25	1.54	218.38	218.02	0.35	---	---	---	---
71	84	85	160	103.91	PEAD/PN10	24	20.81	1.54	218.02	215.86	2.16	---	---	---	---
71	85	86	160	35.63	PEAD/PN10	24	20.81	1.54	215.86	215.12	0.74	---	---	---	---
71	86	87	160	12.21	PEAD/PN10	24	20.81	1.54	215.12	214.87	0.25	---	---	---	---
71	87	88	160	49.63	PEAD/PN10	24	20.81	1.54	214.87	213.83	1.03	---	---	---	---
71	88	89	160	35.44	PEAD/PN10	24	20.81	1.54	213.83	213.1	0.74	---	---	---	---
71	89	90	160	40.31	PEAD/PN10	24	20.81	1.54	213.1	212.26	0.84	---	---	---	---
71	90	91	160	64.03	PEAD/PN10	24	20.81	1.54	212.26	210.93	1.33	---	---	---	---
71	91	92	160	40.36	PEAD/PN10	24	20.81	1.54	210.93	210.09	0.84	---	---	---	---
71	92	93	160	59.49	PEAD/PN10	24	20.81	1.54	210.09	208.85	1.24	---	---	---	---
71	93	94	160	59.06	PEAD/PN10	24	20.81	1.54	208.85	207.62	1.23	---	---	---	---
71	94	95	160	66.19	PEAD/PN10	24	20.81	1.54	207.62	206.24	1.38	---	---	---	---
71	95	96	160	8.75	PEAD/PN10	24	20.81	1.54	206.24	206.06	0.18	---	---	---	---
71	96	97	160	39.34	PEAD/PN10	24	20.81	1.54	206.06	205.24	0.82	---	---	---	---
71	97	98	125	37.58	PEAD/PN10	16	34.67	1.68	205.24	203.94	1.3	---	---	---	---
71	98	99	110	32.2	PEAD/PN10	8	17.42	1.09	203.94	203.38	0.56	195.7	175.7	27.68	7.68
71	78	100	200	8.24	PEAD/PN10	24	5.55	0.98	219.94	219.89	0.05	---	---	---	---
71	100	101	200	42	PEAD/PN10	24	5.55	0.98	219.89		0.23				
71	100	101	160	69.72	PEAD/PN10	24	20.81	1.54	219.66	218.21	1.45	---	---	---	---
71	101	102	160	68.36	PEAD/PN10	24	20.81	1.54	218.21	216.79	1.42	---	---	---	---
71	102	103	160	82.25	PEAD/PN10	16	9.25	1.02	216.79	216.03	0.76	---	---	---	---
71	103	104	110	117.11	PEAD/PN10	8	17.42	1.09	216.03	213.99	2.04	204.6	184.6	29.39	9.39
71	101	105	110	39.15	PEAD/PN10	8	17.42	1.09	218.21	217.53	0.68	212.7	192.7	24.83	4.83
71	103	106	125	84.11	PEAD/PN10	8	8.67	0.84	216.03	215.3	0.73	215.3	195.3	20	0
71	79	107	160	26.05	PEAD/PN10	16	9.25	1.02	219.59	219.35	0.24	---	---	---	---
71	107	108	160	32	PEAD/PN10	8	2.31	0.51	219.35		0.07				
71	107	108	140.0	15.34	PEAD/PN10	8	4.72	0.67	219.27	219.2	0.07	219.2	199.2	20	
71	83	109	110.0	39.32	PEAD/PN10	8	17.42	1.09	218.53	217.84	0.68	215.9	195.9	21.94	1.94
71	84	110	110.0	68	PEAD/PN10	8	17.42	1.09	218.02	216.84	1.18	208.5	188.5	28.34	8.34
71	85	111	160.0	69.49	PEAD/PN10	24	20.81	1.54	215.86	214.42	1.45	---	---	---	---
71	111	112	160.0	41.11	PEAD/PN10	24	20.81	1.54	214.42	213.56	0.86	---	---	---	---
71	112	113	160.0	45	PEAD/PN10	24	20.81	1.54	213.56	212.62	0.94	---	---	---	---
71	113	114	160.0	157.58	PEAD/PN10	24	20.81	1.54	212.62	209.35	3.28	---	---	---	---
71	114	115	160.0	61	PEAD/PN10	16	9.25	1.02	209.35		0.56				
71	114	115	140.0	100.83	PEAD/PN10	16	18.88	1.34	208.78	206.88	1.9	---	---	---	---
71	115	116	125.0	101.64	PEAD/PN10	8	8.67	0.84	206.88	206	0.88	206	186	20	0
71	112	117	125.0	53.22	PEAD/PN10	8	8.67	0.84	213.56	213.1	0.46	213.1	193.1	20	0
71	113	118	110.0	72.99	PEAD/PN10	8	17.42	1.09	212.62	211.35	1.27	202.5	182.5	28.85	8.85
71	115	119	110.0	14.73	PEAD/PN10	8	17.42	1.09	206.88	206.62	0.26	205.7	185.7	20.92	0.92
71	86	120	110.0	22.82	PEAD/PN10	8	17.42	1.09	215.12	214.72	0.4	201.8	181.8	32.92	12.92
71	89	121	110.0	80.21	PEAD/PN10	8	17.42	1.09	213.1	211.7	1.4	199	179	32.7	12.7
71	90	122	110.0	27.35	PEAD/PN10	8	17.42	1.09	212.26	211.78	0.48	200.5	180.5	31.28	11.28
71	91	123	110.0	7.05	PEAD/PN10	8	17.42	1.09	210.93	210.8	0.12	200	180	30.8	10.8
71	92	124	110.0	10.18	PEAD/PN10	8	17.42	1.09	210.09	209.91	0.18	197.5	177.5	32.41	12.41
71	93	125	110.0	14.23	PEAD/PN10	8	17.42	1.09	208.85	208.6	0.25	196.5	176.5	32.1	12.1
71	94	126	110.0	10.71	PEAD/PN10	8	17.42	1.09	207.62	207.43	0.19	196.3	176.3	31.13	11.13
71	95	127	110.0	10.41	PEAD/PN10	8	17.42	1.09	206.24	206.06	0.18	197.8	177.8	28.26	8.26
71	96	128	110.0	18.97	PEAD/PN10	8	17.42	1.09	206.06	205.73	0.33	196.7	176.7	29.03	9.03
71	97	129	110.0	11.02	PEAD/PN10	8	17.42	1.09	205.24	205.05	0.19	198.1	178.1	26.95	6.95
71	98	130	110.0	13.96	PEAD/PN10	8	17.42	1.09	203.94	203.7	0.24	196.9	176.9	26.8	6.8
71	100	131	110.0	70.98	PEAD/PN10	8	17.42	1.09	219.89	218.66	1.24	211.4	191.4	27.26	7.26
70	11	132	250.0	2	PEAD/PN10	24	1.68	0.62	220.39	220.39	0	---	---	---	---
70	132	133	250.0	123	PEAD/PN10	24	1.67	0.62	220.39		0.21				
70	132	133	200.0	20.26	PEAD/PN10	24	5.57	0.98	220.18	220.07	0.11	---	---	---	---
70	133	134	200.0	43.93	PEAD/PN10	24	5.55	0.98	220.07	219.82	0.24	---	---	---	---
70	134	135	200.0	51.86	PEAD/PN10	24	5.55	0.98	219.82	219.54	0.29	---	---	---	---

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70	135	136	200.0	84.93	PEAD/PN10	24	5.55	0.98	219.54	219.06	0.47	---	---	---	---
70	136	137	200.0	74.21	PEAD/PN10	24	5.55	0.98	219.06	218.65	0.41	---	---	---	---
70	137	138	200.0	68.02	PEAD/PN10	24	5.55	0.98	218.65	218.28	0.38	---	---	---	---
70	138	139	200.0	153.49	PEAD/PN10	24	5.55	0.98	218.28	217.42	0.85	---	---	---	---
70	139	140	200.0	57.87	PEAD/PN10	24	5.55	0.98	217.42	217.1	0.32	---	---	---	---
70	140	141	200.0	27.45	PEAD/PN10	24	5.55	0.98	217.1	216.95	0.15	---	---	---	---
70	141	142	160.0	63.36	PEAD/PN10	24	20.81	1.54	216.95	215.63	1.32	---	---	---	---
70	142	143	125.0	49.21	PEAD/PN10	16	34.67	1.68	215.63	213.93	1.71	---	---	---	---
70	143	144	110.0	93.69	PEAD/PN10	8	17.42	1.09	213.93	212.29	1.63	203	183	29.29	9.29
70	133	145	160.0	129.89	PEAD/PN10	24	20.81	1.54	220.07	217.36	2.7	---	---	---	---
70	145	146	125.0	80.78	PEAD/PN10	16	34.67	1.68	217.36	214.56	2.8	---	---	---	---
70	146	147	110.0	177.26	PEAD/PN10	8	17.42	1.09	214.56	211.48	3.09	201.8	181.8	29.68	9.68
70	145	148	110.0	38.89	PEAD/PN10	8	17.42	1.09	217.36	216.69	0.68	207.5	187.5	29.19	9.19
70	146	149	110.0	18.42	PEAD/PN10	8	17.42	1.09	214.56	214.24	0.32	205.5	185.5	28.74	8.74
70	134	150	110.0	48.93	PEAD/PN10	8	17.42	1.09	219.82	218.97	0.85	215	195	23.97	3.97
70	135	151	110.0	26.88	PEAD/PN10	8	17.42	1.09	219.54	219.07	0.47	219	200	19.07	0.07
70	136	152	160.0	71.66	PEAD/PN10	24	20.81	1.54	219.06	217.57	1.49	---	---	---	---
70	152	153	160.0	20.44	PEAD/PN10	24	20.81	1.54	217.57	217.15	0.43	---	---	---	---
70	153	154	125.0	103.54	PEAD/PN10	16	34.67	1.68	217.15	213.56	3.59	---	---	---	---
70	154	155	110.0	169.11	PEAD/PN10	8	17.42	1.09	213.56	210.61	2.95	198.5	178.5	32.11	12.11
70	152	156	110.0	65.42	PEAD/PN10	8	17.42	1.09	217.57	216.43	1.14	204.8	184.8	31.63	11.63
70	153	157	110.0	60.42	PEAD/PN10	8	17.42	1.09	217.15	216.1	1.05	208.5	188.5	27.6	7.6
70	137	158	110.0	44.54	PEAD/PN10	8	17.42	1.09	218.65	217.88	0.78	207.3	187.3	30.58	10.58
70	138	159	110.0	24.29	PEAD/PN10	8	17.42	1.09	218.28	217.85	0.42	205.5	185.5	32.35	12.35
70	140	160	200.0	64	PEAD/PN10	24	5.51	0.98	217.1	---	0.35	---	---	---	---
70	140	160	160.0	34.51	PEAD/PN10	24	21.05	1.54	216.75	216.02	0.73	---	---	---	---
70	160	161	160.0	88.04	PEAD/PN10	24	20.81	1.54	216.02	214.19	1.83	---	---	---	---
70	161	162	160.0	37	PEAD/PN10	16	9.25	1.02	214.19	213.85	0.34	---	---	---	---
70	162	163	110.0	109.62	PEAD/PN10	8	17.42	1.09	213.85	211.94	1.91	170.8	145.8	66.14	41.14
70	162	164	125.0	98.03	PEAD/PN10	8	8.67	0.84	213.85	213	0.85	213	193	20	0
70	141	165	160.0	108.34	PEAD/PN10	8	2.31	0.51	216.95	216.7	0.25	216.7	196.7	20	0
70	142	166	160.0	26.05	PEAD/PN10	16	9.25	1.02	215.63	215.39	0.24	---	---	---	---
70	166	167	125.0	51	PEAD/PN10	8	8.67	0.84	215.39	---	0.44	---	---	---	---
70	166	167	110.0	25.94	PEAD/PN10	8	17.42	1.09	214.95	214.5	0.45	214.5	194.5	20	---
70	143	168	110.0	59.18	PEAD/PN10	8	17.42	1.09	213.93	212.9	1.03	212	192	20.9	0.9
78	12	169	250.0	2	PEAD/PN10	24	1.68	0.62	219.44	219.43	0	---	---	---	---
78	169	170	250.0	102.98	PEAD/PN10	24	1.68	0.62	219.43	219.26	0.17	---	---	---	---
78	170	171	250.0	55.93	PEAD/PN10	24	1.68	0.62	219.26	219.17	0.09	---	---	---	---
78	171	172	160.0	41.63	PEAD/PN10	24	20.81	1.54	219.17	218.3	0.87	---	---	---	---
78	172	173	160.0	82.58	PEAD/PN10	24	20.81	1.54	218.3	216.58	1.72	---	---	---	---
78	173	174	160.0	49.03	PEAD/PN10	24	20.81	1.54	216.58	215.56	1.02	---	---	---	---
78	174	175	160.0	19.55	PEAD/PN10	24	20.81	1.54	215.56	215.16	0.41	---	---	---	---
78	175	176	160.0	82.3	PEAD/PN10	24	20.81	1.54	215.16	213.44	1.71	---	---	---	---
78	176	177	160.0	38.97	PEAD/PN10	24	20.81	1.54	213.44	212.63	0.81	---	---	---	---
78	177	178	160.0	54.5	PEAD/PN10	24	20.81	1.54	212.63	211.5	1.13	---	---	---	---
78	178	179	160.0	35.88	PEAD/PN10	24	20.81	1.54	211.5	210.75	0.75	---	---	---	---
78	179	180	160.0	89	PEAD/PN10	24	20.81	1.54	210.75	208.9	1.85	---	---	---	---
78	180	181	160.0	26.33	PEAD/PN10	24	20.81	1.54	208.9	208.35	0.55	---	---	---	---
78	181	182	160.0	113.25	PEAD/PN10	24	20.81	1.54	208.35	206	2.36	---	---	---	---
78	182	183	160.0	86.69	PEAD/PN10	24	20.81	1.54	206	204.19	1.8	---	---	---	---
78	183	184	160.0	51.66	PEAD/PN10	24	20.81	1.54	204.19	203.12	1.07	---	---	---	---
78	184	185	160.0	66.55	PEAD/PN10	24	20.81	1.54	203.12	201.73	1.38	---	---	---	---
78	185	186	125.0	69.48	PEAD/PN10	16	34.67	1.68	201.73	199.33	2.41	---	---	---	---
78	186	187	110.0	208.94	PEAD/PN10	8	17.42	1.09	199.33	195.69	3.64	192.2	167.2	28.49	3.49
78	176	188	125.0	68.59	PEAD/PN10	16	34.67	1.68	213.44	211.07	2.38	---	---	---	---
78	188	189	110.0	33.59	PEAD/PN10	8	17.42	1.09	211.07	210.48	0.59	195.9	175.9	34.58	14.58
78	188	190	110.0	68.67	PEAD/PN10	8	17.42	1.09	211.07	209.87	1.2	194.8	174.8	35.07	15.07
78	177	191	110.0	33.06	PEAD/PN10	8	17.42	1.09	212.63	212.06	0.58	194.5	174.5	37.56	17.56
78	178	192	110.0	31.08	PEAD/PN10	8	17.42	1.09	211.5	210.96	0.54	192.9	172.9	38.06	18.06
78	179	193	110.0	30.48	PEAD/PN10	8	17.42	1.09	210.75	210.22	0.53	193.1	173.1	37.12	17.12
78	180	194	110.0	35.32	PEAD/PN10	8	17.42	1.09	208.9	208.29	0.62	190.6	170.6	37.69	17.69
78	182	195	110.0	48.51	PEAD/PN10	8	17.42	1.09	206	205.15	0.84	192.4	172.4	32.75	12.75
78	183	196	110.0	9.8	PEAD/PN10	8	17.42	1.09	204.19	204.02	0.17	192.3	172.3	31.72	11.72
78	184	197	110.0	53.07	PEAD/PN10	8	17.42	1.09	203.12	202.19	0.92	192.5	167.5	34.69	9.69
78	185	198	110.0	25.8	PEAD/PN10	8	17.42	1.09	201.73	201.29	0.45	193.1	168.1	33.19	8.19
78	186	199	110.0	36.63	PEAD/PN10	8	17.42	1.09	199.33	198.69	0.64	191	166	32.69	7.69
78	171	200	250.0	76.91	PEAD/PN10	24	1.68	0.62	219.17	219.04	0.13	---	---	---	---
78	200	201	250.0	70.64	PEAD/PN10	24	1.68	0.62	219.04	218.92	0.12	---	---	---	---
78	201	202	250.0	73.64	PEAD/PN10	24	1.68	0.62	218.92	218.8	0.12	---	---	---	---
78	202	203	250.0	69.67	PEAD/PN10	24	1.68	0.62	218.8	218.68	0.12	---	---	---	---
78	203	204	250.0	67.95	PEAD/PN10	24	1.68	0.62	218.68	218.57	0.11	---	---	---	---
78	204	205	250.0	86.88	PEAD/PN10	24	1.68	0.62	218.57	218.42	0.15	---	---	---	---
78	205	206	250.0	53.6	PEAD/PN10	24	1.68	0.62	218.42	218.33	0.09	---	---	---	---
78	206	207	250.0	101.69	PEAD/PN10	24	1.68	0.62	218.33	218.16	0.17	---	---	---	---
78	207	208	250.0	26.85	PEAD/PN10	24	1.68	0.62	218.16	218.12	0.05	---	---	---	---

Consorzio di Bonifica n.2 - Palermo

"Ammodernamento della rete irrigua dello Jato – I lotto sotto sollevamento" - Progetto Definitivo

Relazione dei calcoli idraulici

78	208	209	250.0	28.87	PEAD/PN10	24	1.68	0.62	218.12	218.07	0.05	---	---	---	---
78	209	210	160.0	76.06	PEAD/PN10	16	9.25	1.02	218.07	217.36	0.7	---	---	---	---
78	210	211	160.0	49	PEAD/PN10	8	2.29	0.51	217.36		0.11	---	---	---	---
78	210	211	140.0	52.87	PEAD/PN10	8	4.75	0.67	217.25	217	0.25	217	200.2	16.8	
78	202	212	110.0	44.57	PEAD/PN10	8	17.42	1.09	218.8	218.02	0.78	208.5	188.5	29.52	9.52
78	203	213	110.0	23.95	PEAD/PN10	8	17.42	1.09	218.68	218.26	0.42	210.2	190.2	28.06	8.06
78	204	214	110.0	34.7	PEAD/PN10	8	17.42	1.09	218.57	217.96	0.6	211.5	191.5	26.46	6.46
78	208	215	140.0	137	PEAD/PN10	8	4.72	0.67	218.12		0.65				
78	208	215	125.0	54.07	PEAD/PN10	8	8.67	0.84	217.47	217	0.47	217	198.7	18.3	
78	209	216	160.0	29.02	PEAD/PN10	8	2.31	0.51	218.07	218	0.07	218	198.7	19.3	0
78	210	217	160.0	12	PEAD/PN10	8	2.31	0.51	217.36		0.03				
78	210	217	140.0	71.37	PEAD/PN10	8	4.72	0.67	217.34	217	0.34	217	200.2	16.8	
75	14	218	200.0	2	PEAD/PN10	24	5.55	0.98	215.68	215.67	0.01	---	---	---	---
75	218	219	200.0	39.12	PEAD/PN10	24	5.55	0.98	215.67	215.46	0.22	---	---	---	---
75	219	220	200.0	46.91	PEAD/PN10	24	5.55	0.98	215.46	215.2	0.26	---	---	---	---
75	220	221	200.0	10.97	PEAD/PN10	24	5.55	0.98	215.2	215.14	0.06	---	---	---	---
75	221	222	200.0	36.75	PEAD/PN10	24	5.55	0.98	215.14	214.93	0.2	---	---	---	---
75	222	223	200.0	58.08	PEAD/PN10	24	5.55	0.98	214.93	214.61	0.32	---	---	---	---
75	223	224	200.0	102.17	PEAD/PN10	24	5.55	0.98	214.61	214.04	0.57	---	---	---	---
75	224	225	200.0	144.83	PEAD/PN10	24	5.55	0.98	214.04	213.24	0.8	---	---	---	---
75	225	226	200.0	44.25	PEAD/PN10	24	5.55	0.98	213.24	212.99	0.25	---	---	---	---
75	226	227	200.0	43.73	PEAD/PN10	24	5.55	0.98	212.99	212.75	0.24	---	---	---	---
75	227	228	200.0	14.7	PEAD/PN10	24	5.55	0.98	212.75	212.67	0.08	---	---	---	---
75	228	229	200.0	100.35	PEAD/PN10	24	5.55	0.98	212.67	212.11	0.56	---	---	---	---
75	229	230	200.0	42.98	PEAD/PN10	24	5.55	0.98	212.11	211.88	0.24	---	---	---	---
75	230	231	200.0	46.62	PEAD/PN10	24	5.55	0.98	211.88	211.62	0.26	---	---	---	---
75	231	232	200.0	29.98	PEAD/PN10	24	5.55	0.98	211.62	211.45	0.17	---	---	---	---
75	232	233	200.0	66	PEAD/PN10	24	5.55	0.98	211.45		0.37	---	---	---	---
75	232	233	160.0	16.31	PEAD/PN10	24	20.81	1.54	211.08	210.74	0.34	---	---	---	---
75	233	234	160.0	100.23	PEAD/PN10	24	20.81	1.54	210.74	208.66	2.09	---	---	---	---
75	234	235	160.0	87	PEAD/PN10	16	9.25	1.02	208.66	207.86	0.8	---	---	---	---
75	235	236	125.0	99.06	PEAD/PN10	8	8.67	0.84	207.86	207	0.86	207	187	20	0
75	219	237	125.0	10.86	PEAD/PN10	16	34.67	1.68	215.46	215.08	0.38	---	---	---	---
75	237	238	110.0	65.07	PEAD/PN10	8	17.42	1.09	215.08	213.95	1.13	202.8	182.8	31.15	11.15
75	220	239	110.0	26.77	PEAD/PN10	8	17.42	1.09	215.2	214.73	0.47	201.2	181.2	33.53	13.53
75	221	240	110.0	17.91	PEAD/PN10	8	17.42	1.09	215.14	214.82	0.31	202	182	32.82	12.82
75	222	241	110.0	17.84	PEAD/PN10	8	17.42	1.09	214.93	214.62	0.31	201.2	181.2	33.42	13.42
75	222	242	110.0	18.48	PEAD/PN10	8	17.42	1.09	214.93	214.61	0.32	200.5	180.5	34.11	14.11
75	223	243	110.0	18.67	PEAD/PN10	8	17.42	1.09	214.61	214.28	0.33	199.8	179.8	34.48	14.48
75	223	244	110.0	20.42	PEAD/PN10	8	17.42	1.09	214.61	214.25	0.36	201.2	181.2	33.05	13.05
75	224	245	110.0	24.61	PEAD/PN10	8	17.42	1.09	214.04	213.61	0.43	200.5	180.5	33.11	13.11
75	225	246	110.0	16.91	PEAD/PN10	8	17.42	1.09	213.24	212.95	0.29	200.3	180.3	32.65	12.65
75	225	247	110.0	119.32	PEAD/PN10	8	17.42	1.09	213.24	211.16	2.08	179	154	57.16	32.16
75	226	248	110.0	81.3	PEAD/PN10	8	17.42	1.09	212.99	211.58	1.42	198	178	33.58	13.58
75	227	249	110.0	66.55	PEAD/PN10	8	17.42	1.09	212.75	211.59	1.16	198.2	178.2	33.39	13.39
75	228	250	110.0	19.29	PEAD/PN10	8	17.42	1.09	212.67	212.33	0.34	199.5	179.5	32.83	12.83
75	229	251	110.0	20.95	PEAD/PN10	8	17.42	1.09	212.11	211.75	0.36	201.5	181.5	30.25	10.25
75	230	252	160.0	32.69	PEAD/PN10	24	20.81	1.54	211.88	211.2	0.68	---	---	---	---
75	252	253	125.0	58.45	PEAD/PN10	16	34.67	1.68	211.2	209.17	2.03	---	---	---	---
75	253	254	110.0	79.1	PEAD/PN10	8	17.42	1.09	209.17	207.79	1.38	192.9	172.9	34.89	14.89
75	252	255	110.0	32.39	PEAD/PN10	8	17.42	1.09	211.2	210.63	0.56	199.2	179.2	31.43	11.43
75	253	256	110.0	19.43	PEAD/PN10	8	17.42	1.09	209.17	208.83	0.34	196.2	176.2	32.63	12.63
75	232	257	160.0	73.1	PEAD/PN10	24	20.81	1.54	211.45	209.93	1.52	---	---	---	---
75	257	258	160.0	32.04	PEAD/PN10	24	20.81	1.54	209.93	209.26	0.67	---	---	---	---
75	258	259	125.0	86.05	PEAD/PN10	16	34.67	1.68	209.26	206.28	2.98	---	---	---	---
75	259	260	110.0	23.94	PEAD/PN10	8	17.42	1.09	206.28	205.86	0.42	185	160	45.86	20.86
75	259	261	110.0	105.13	PEAD/PN10	8	17.42	1.09	206.28	204.45	1.83	189	164	40.45	15.45
75	233	262	110.0	77	PEAD/PN10	8	17.42	1.09	210.74	209.4	1.34	204.7	184.7	24.7	4.7
75	234	263	110.0	55.24	PEAD/PN10	8	17.42	1.09	208.66	207.7	0.96	205.5	185.5	22.2	2.2
75	235	264	110.0	26.85	PEAD/PN10	8	17.42	1.09	207.86	207.39	0.47	206.8	186.8	20.59	0.59
75	231	265	110.0	13.1	PEAD/PN10	8	17.42	1.09	211.62	211.39	0.23	202.5	182.5	28.89	8.89
72	16	266	200.0	2	PEAD/PN10	24	5.55	0.98	214.18	214.17	0.01	---	---	---	---
72	266	267	200.0	60	PEAD/PN10	24	5.55	0.98	214.17		0.33	---	---	---	---
72	266	267	160.0	342.12	PEAD/PN10	24	20.81	1.54	213.84	206.72	7.12	---	---	---	---
72	267	268	160.0	134.69	PEAD/PN10	24	20.81	1.54	206.72	203.92	2.8	---	---	---	---
72	268	269	160.0	60.83	PEAD/PN10	24	20.81	1.54	203.92	202.65	1.27	---	---	---	---
72	269	270	160.0	69.19	PEAD/PN10	24	20.81	1.54	202.65	201.21	1.44	---	---	---	---
72	270	271	160.0	107.22	PEAD/PN10	24	20.81	1.54	201.21	198.98	2.23	---	---	---	---
72	271	272	160.0	31.37	PEAD/PN10	24	20.81	1.54	198.98	198.33	0.65	---	---	---	---
72	272	273	160.0	44.94	PEAD/PN10	24	20.81	1.54	198.33	197.39	0.94	---	---	---	---
72	273	274	160.0	124.29	PEAD/PN10	24	20.81	1.54	197.39	194.81	2.59	---	---	---	---
72	274	275	125.0	116.37	PEAD/PN10	16	34.67	1.68	194.81	190.77	4.03	---	---	---	---
72	275	276	110.0	132.96	PEAD/PN10	8	17.42	1.09	190.77	188.46	2.32	186.8	161.8	26.66	1.66
72	267	277	110.0	16.74	PEAD/PN10	8	17.42	1.09	206.72	206.43	0.29	195.5	175.5	30.93	10.93
72	268	278	110.0	12.55	PEAD/PN10	8	17.42	1.09	203.92	203.7	0.22	190.7	170.7	33	13

Consorzio di Bonifica n.2 - Palermo

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72	269	279	110.0	30.8	PEAD/PN10	8	17.42	1.09	202.65	202.11	0.54	190.5	170.5	31.61	11.61
72	270	280	110.0	21.24	PEAD/PN10	8	17.42	1.09	201.21	200.84	0.37	190.5	170.5	30.34	10.34
72	272	281	160.0	84.64	PEAD/PN10	24	20.81	1.54	198.33	196.57	1.76	---	---	---	---
72	281	282	160.0	48.54	PEAD/PN10	24	20.81	1.54	196.57	195.56	1.01	---	---	---	---
72	282	283	160.0	30.62	PEAD/PN10	24	20.81	1.54	195.56	194.92	0.64	---	---	---	---
72	283	284	160.0	13.99	PEAD/PN10	24	20.81	1.54	194.92	194.63	0.29	---	---	---	---
72	284	285	160.0	61.57	PEAD/PN10	24	20.81	1.54	194.63	193.35	1.28	---	---	---	---
72	285	286	160.0	45.44	PEAD/PN10	24	20.81	1.54	193.35	192.4	0.95	---	---	---	---
72	286	287	160.0	47.72	PEAD/PN10	24	20.81	1.54	192.4	191.41	0.99	---	---	---	---
72	287	288	160.0	50	PEAD/PN10	16	9.18	1.02	191.41		0.46	---	---	---	---
72	287	288	140.0	20.53	PEAD/PN10	16	19.24	1.34	190.95	190.56	0.39	---	---	---	---
72	288	289	110.0	41.47	PEAD/PN10	8	17.42	1.09	190.56	189.83	0.72	187.8	162.8	27.03	2.03
72	273	290	110.0	11.9	PEAD/PN10	8	17.42	1.09	197.39	197.19	0.21	191.1	171.1	26.09	6.09
72	274	291	110.0	15.86	PEAD/PN10	8	17.42	1.09	194.81	194.53	0.28	194.4	169.4	25.13	0.13
72	275	292	110.0	12.53	PEAD/PN10	8	17.42	1.09	190.77	190.56	0.22	190.5	165.5	25.06	0.06
72	281	293	110.0	10.57	PEAD/PN10	8	17.42	1.09	196.57	196.38	0.18	190.5	170.5	25.88	5.88
72	282	294	110.0	6.82	PEAD/PN10	8	17.42	1.09	195.56	195.44	0.12	194.5	169.5	25.94	0.94
72	283	295	110.0	13.9	PEAD/PN10	8	17.42	1.09	194.92	194.68	0.24	190.1	170.1	24.58	4.58
72	284	296	125.0	15.19	PEAD/PN10	8	8.67	0.84	194.63	194.5	0.13	194.5	169.5	25	0
72	285	297	110.0	13.95	PEAD/PN10	8	17.42	1.09	193.35	193.11	0.24	191.5	166.5	26.61	1.61
72	286	298	110.0	13.09	PEAD/PN10	8	17.42	1.09	192.4	192.17	0.23	190.6	165.6	26.57	1.57
72	287	299	125.0	13.86	PEAD/PN10	8	8.67	0.84	191.41	191.29	0.12	191.2	166.2	25.09	0.09
72	288	300	125.0	29.85	PEAD/PN10	8	8.67	0.84	190.56	190.3	0.26	190.3	165.3	25	0
72	266	301	160.0	27.77	PEAD/PN10	24	20.81	1.54	214.17	213.59	0.58	---	---	---	---
72	301	302	160.0	170.01	PEAD/PN10	24	20.81	1.54	213.59	210.05	3.54	---	---	---	---
72	302	303	160.0	99.96	PEAD/PN10	24	20.81	1.54	210.05	207.98	2.08	---	---	---	---
72	303	304	160.0	52.43	PEAD/PN10	24	20.81	1.54	207.98	206.88	1.09	---	---	---	---
72	304	305	160.0	15.25	PEAD/PN10	24	20.81	1.54	206.88	206.57	0.32	---	---	---	---
72	305	306	160.0	24.55	PEAD/PN10	24	20.81	1.54	206.57	206.06	0.51	---	---	---	---
72	306	307	160.0	21.84	PEAD/PN10	24	20.81	1.54	206.06	205.6	0.45	---	---	---	---
72	307	308	160.0	20.14	PEAD/PN10	24	20.81	1.54	205.6	205.18	0.42	---	---	---	---
72	308	309	160.0	119.35	PEAD/PN10	24	20.81	1.54	205.18	202.7	2.48	---	---	---	---
72	309	310	160.0	16.58	PEAD/PN10	24	20.81	1.54	202.7	202.35	0.34	---	---	---	---
72	310	311	160.0	12.96	PEAD/PN10	24	20.81	1.54	202.35	202.09	0.27	---	---	---	---
72	311	312	160.0	28.94	PEAD/PN10	24	20.81	1.54	202.09	201.48	0.6	---	---	---	---
72	312	313	160.0	24.33	PEAD/PN10	24	20.81	1.54	201.48	200.98	0.51	---	---	---	---
72	313	314	160.0	40.5	PEAD/PN10	24	20.81	1.54	200.98	200.13	0.84	---	---	---	---
72	314	315	160.0	102.7	PEAD/PN10	24	20.81	1.54	200.13	198	2.14	---	---	---	---
72	315	316	160.0	138.17	PEAD/PN10	24	20.81	1.54	198	195.12	2.87	---	---	---	---
72	316	317	160.0	67.84	PEAD/PN10	24	20.81	1.54	195.12	193.71	1.41	---	---	---	---
72	317	318	160.0	47.13	PEAD/PN10	24	20.81	1.54	193.71	192.73	0.98	---	---	---	---
72	318	319	125.0	74.5	PEAD/PN10	16	34.67	1.68	192.73	190.15	2.58	---	---	---	---
72	319	320	110.0	141.28	PEAD/PN10	8	17.42	1.09	190.15	187.69	2.46	181.5	156.5	31.19	6.19
72	303	321	110.0	14.05	PEAD/PN10	8	17.42	1.09	207.98	207.73	0.24	196.1	176.1	31.63	11.63
72	304	322	110.0	16.16	PEAD/PN10	8	17.42	1.09	206.88	206.6	0.28	195.8	175.8	30.8	10.8
72	305	323	110.0	27.26	PEAD/PN10	8	17.42	1.09	206.57	206.09	0.47	195.5	175.5	30.59	10.59
72	306	324	110.0	10.32	PEAD/PN10	8	17.42	1.09	206.06	205.88	0.18	196.2	176.2	29.68	9.68
72	307	325	110.0	23.21	PEAD/PN10	8	17.42	1.09	205.6	205.2	0.4	195.6	175.6	29.6	9.6
72	308	326	110.0	15.59	PEAD/PN10	8	17.42	1.09	205.18	204.91	0.27	195	175	29.91	9.91
72	309	327	110.0	19.26	PEAD/PN10	8	17.42	1.09	202.7	202.36	0.34	195	175	27.36	7.36
72	310	328	110.0	20.13	PEAD/PN10	8	17.42	1.09	202.35	202	0.35	194.2	174.2	27.8	7.8
72	311	329	110.0	14.55	PEAD/PN10	8	17.42	1.09	202.09	201.83	0.25	194.2	174.2	27.63	7.63
72	312	330	110.0	16.46	PEAD/PN10	8	17.42	1.09	201.48	201.2	0.29	193	173	28.2	8.2
72	313	331	110.0	14.2	PEAD/PN10	8	17.42	1.09	200.98	200.73	0.25	192	172	28.73	8.73
72	314	332	110.0	16.77	PEAD/PN10	8	17.42	1.09	200.13	199.84	0.29	190.5	170.5	29.34	9.34
72	315	333	110.0	15.22	PEAD/PN10	8	17.42	1.09	198	197.73	0.27	194.5	169.5	28.23	3.23
72	316	334	110.0	9.67	PEAD/PN10	8	17.42	1.09	195.12	194.95	0.17	191	166	28.95	3.95
72	317	335	110.0	7.77	PEAD/PN10	8	17.42	1.09	193.71	193.58	0.14	191	166	27.58	2.58
72	318	336	110.0	20.94	PEAD/PN10	8	17.42	1.09	192.73	192.37	0.36	188	163	29.37	4.37
72	319	337	110.0	12.07	PEAD/PN10	8	17.42	1.09	190.15	189.94	0.21	188.9	163.9	26.04	1.04
72	301	338	160.0	22.93	PEAD/PN10	24	20.81	1.54	213.59	213.12	0.48	---	---	---	---
72	338	339	125.0	27.85	PEAD/PN10	16	34.67	1.68	213.12	212.15	0.97	---	---	---	---
72	339	340	110.0	166.54	PEAD/PN10	8	17.42	1.09	212.15	209.25	2.9	196	176	33.25	13.25
72	338	341	110.0	14.14	PEAD/PN10	8	17.42	1.09	213.12	212.87	0.25	198.5	178.5	34.37	14.37
72	339	342	110.0	8.42	PEAD/PN10	8	17.42	1.09	212.15	212	0.15	198.2	178.2	33.8	13.8
73	17	343	200.0	2	PEAD/PN10	24	5.55	0.98	213.85	213.84	0.01	---	---	---	---
73	343	344	160.0	119.74	PEAD/PN10	24	20.81	1.54	213.84	211.35	2.49	---	---	---	---
73	344	345	125.0	109.28	PEAD/PN10	16	34.67	1.68	211.35	207.56	3.79	---	---	---	---
73	345	346	110.0	162.9	PEAD/PN10	8	17.42	1.09	207.56	204.72	2.84	197	177	27.72	7.72
73	344	347	110.0	64.05	PEAD/PN10	8	17.42	1.09	211.35	210.23	1.12	196.2	176.2	34.03	14.03
73	345	348	110.0	42.37	PEAD/PN10	8	17.42	1.09	207.56	206.82	0.74	198.5	178.5	28.32	8.32
73	343	349	200.0	8.93	PEAD/PN10	24	5.55	0.98	213.84	213.79	0.05	---	---	---	---
73	349	350	110.0	22.67	PEAD/PN10	8	17.42	1.09	213.79	213.39	0.39	196.8	176.8	36.59	16.59
73	349	351	200.0	67.38	PEAD/PN10	24	5.55	0.98	213.79	213.41	0.37	---	---	---	---
73	351	352	200.0	62.12	PEAD/PN10	24	5.55	0.98	213.41	213.07	0.34	---	---	---	---

Consorzio di Bonifica n.2 - Palermo

"Ammodernamento della rete irrigua dello Jato – I lotto sotto sollevamento" - Progetto Definitivo

Relazione dei calcoli idraulici

73	352	353	200.0	33.88	PEAD/PN10	24	5.55	0.98	213.07	212.88	0.19	---	---	---	---
73	353	354	200.0	69.32	PEAD/PN10	24	5.55	0.98	212.88	212.5	0.38	---	---	---	---
73	354	355	200.0	96.07	PEAD/PN10	24	5.55	0.98	212.5	211.96	0.53	---	---	---	---
73	355	356	200.0	54.51	PEAD/PN10	24	5.55	0.98	211.96	211.66	0.3	---	---	---	---
73	356	357	200.0	92	PEAD/PN10	24	5.55	0.98	211.66		0.51	---	---	---	---
73	356	357	160.0	26.65	PEAD/PN10	24	20.81	1.54	211.15	210.6	0.55	---	---	---	---
73	357	358	160.0	102.94	PEAD/PN10	24	20.81	1.54	210.6	208.46	2.14	---	---	---	---
73	358	359	160.0	133.68	PEAD/PN10	24	20.81	1.54	208.46	205.67	2.78	---	---	---	---
73	359	360	160.0	16.43	PEAD/PN10	24	20.81	1.54	205.67	205.33	0.34	---	---	---	---
73	360	361	160.0	160.28	PEAD/PN10	24	20.81	1.54	205.33	202	3.33	---	---	---	---
73	361	362	160.0	51.51	PEAD/PN10	24	20.81	1.54	202	200.93	1.07	---	---	---	---
73	362	363	160.0	87.63	PEAD/PN10	24	20.81	1.54	200.93	199.1	1.82	---	---	---	---
73	363	364	160.0	167.79	PEAD/PN10	24	20.81	1.54	199.1	195.61	3.49	---	---	---	---
73	364	365	160.0	144.53	PEAD/PN10	24	20.81	1.54	195.61	192.61	3.01	---	---	---	---
73	365	366	160.0	179.29	PEAD/PN10	24	20.81	1.54	192.61	188.87	3.73	---	---	---	---
73	366	367	140.0	130.13	PEAD/PN10	16	18.88	1.34	188.87	186.42	2.46	---	---	---	---
73	367	368	125.0	48.4	PEAD/PN10	8	8.67	0.84	186.42	186	0.42	186	161	25	0
73	351	369	110.0	37.99	PEAD/PN10	8	17.42	1.09	213.41	212.75	0.66	194	174	38.75	18.75
73	352	370	160.0	56.28	PEAD/PN10	24	20.81	1.54	213.07	211.9	1.17	---	---	---	---
73	370	371	160.0	102.32	PEAD/PN10	24	20.81	1.54	211.9	209.77	2.13	---	---	---	---
73	371	372	160.0	66.61	PEAD/PN10	24	20.81	1.54	209.77	208.38	1.39	---	---	---	---
73	372	373	160.0	58.16	PEAD/PN10	24	20.81	1.54	208.38	207.17	1.21	---	---	---	---
73	373	374	125.0	55.03	PEAD/PN10	16	34.67	1.68	207.17	205.27	1.91	---	---	---	---
73	374	375	110.0	163.33	PEAD/PN10	8	17.42	1.09	205.27	202.42	2.84	190.3	165.3	37.12	12.12
73	370	376	110.0	26.72	PEAD/PN10	8	17.42	1.09	211.9	211.43	0.47	192.1	172.1	39.33	19.33
73	371	377	110.0	22.71	PEAD/PN10	8	17.42	1.09	209.77	209.37	0.4	191.5	171.5	37.87	17.87
73	372	378	110.0	22.76	PEAD/PN10	8	17.42	1.09	208.38	207.99	0.4	194.5	169.5	38.49	13.49
73	373	379	110.0	69.06	PEAD/PN10	8	17.42	1.09	207.17	205.97	1.2	192.8	167.8	38.17	13.17
73	374	380	110.0	53.15	PEAD/PN10	8	17.42	1.09	205.27	204.34	0.93	192.5	167.5	36.84	11.84
73	353	381	110.0	45.88	PEAD/PN10	8	17.42	1.09	212.88	212.08	0.8	194.2	169.2	42.88	17.88
73	354	382	110.0	237.01	PEAD/PN10	8	17.42	1.09	212.5	208.37	4.13	191	171	37.37	17.37
73	355	383	110.0	37.9	PEAD/PN10	8	17.42	1.09	211.96	211.3	0.66	191.6	171.6	39.7	19.7
73	356	384	110.0	42.84	PEAD/PN10	8	17.42	1.09	211.66	210.92	0.75	191.9	171.9	39.02	19.02
73	358	385	110.0	75.28	PEAD/PN10	8	17.42	1.09	208.46	207.14	1.31	191.5	171.5	35.64	15.64
73	359	386	110.0	40.4	PEAD/PN10	8	17.42	1.09	205.67	204.97	0.7	190	170	34.97	14.97
73	360	387	110.0	94.39	PEAD/PN10	8	17.42	1.09	205.33	203.69	1.64	192	167	36.69	11.69
73	361	388	160.0	23.91	PEAD/PN10	24	20.81	1.54	202	201.5	0.5	---	---	---	---
73	388	389	160.0	34.26	PEAD/PN10	24	20.81	1.54	201.5	200.79	0.71	---	---	---	---
73	389	390	160.0	101.73	PEAD/PN10	24	20.81	1.54	200.79	198.67	2.12	---	---	---	---
73	390	391	160.0	43.77	PEAD/PN10	24	20.81	1.54	198.67	197.76	0.91	---	---	---	---
73	391	392	125.0	52.99	PEAD/PN10	16	34.67	1.68	197.76	195.92	1.84	---	---	---	---
73	392	393	110.0	84.65	PEAD/PN10	8	17.42	1.09	195.92	194.45	1.47	184.5	159.5	34.95	9.95
73	388	394	110.0	71.6	PEAD/PN10	8	17.42	1.09	201.5	200.25	1.25	194.2	169.2	31.05	6.05
73	389	395	110.0	69.24	PEAD/PN10	8	17.42	1.09	200.79	199.58	1.21	194.2	169.2	30.38	5.38
73	390	396	110.0	77.54	PEAD/PN10	8	17.42	1.09	198.67	197.32	1.35	188.5	163.5	33.82	8.82
73	391	397	110.0	19.43	PEAD/PN10	8	17.42	1.09	197.76	197.42	0.34	192	167	30.42	5.42
73	392	398	110.0	40.21	PEAD/PN10	8	17.42	1.09	195.92	195.22	0.7	190.3	170.3	24.92	4.92
73	362	399	110.0	39.33	PEAD/PN10	8	17.42	1.09	200.93	200.24	0.68	194.5	169.5	30.74	5.74
73	363	400	110.0	35.06	PEAD/PN10	8	17.42	1.09	199.1	198.49	0.61	194.4	169.4	29.09	4.09
73	364	401	160.0	94.73	PEAD/PN10	24	20.81	1.54	195.61	193.64	1.97	---	---	---	---
73	401	402	160.0	39.57	PEAD/PN10	24	20.81	1.54	193.64	192.82	0.82	---	---	---	---
73	402	403	160.0	48.89	PEAD/PN10	24	20.81	1.54	192.82	191.8	1.02	---	---	---	---
73	403	404	140.0	35.23	PEAD/PN10	16	18.88	1.34	191.8	191.14	0.67	---	---	---	---
73	404	405	110.0	69.92	PEAD/PN10	8	17.42	1.09	191.14	189.92	1.22	185.8	160.8	29.12	4.12
73	401	406	110.0	32.69	PEAD/PN10	8	17.42	1.09	193.64	193.07	0.57	192.5	167.5	25.57	0.57
73	402	407	110.0	60.93	PEAD/PN10	8	17.42	1.09	192.82	191.76	1.06	191.5	166.5	25.26	0.26
73	403	408	110.0	25.42	PEAD/PN10	8	17.42	1.09	191.8	191.36	0.44	190.2	165.2	26.16	1.16
73	404	409	110.0	18.56	PEAD/PN10	8	17.42	1.09	191.14	190.81	0.32	190.8	165.8	25.01	0.01
73	365	410	110.0	43.18	PEAD/PN10	8	17.42	1.09	192.61	191.85	0.75	189.2	164.2	27.65	2.65
73	366	411	125.0	20.13	PEAD/PN10	16	34.67	1.68	188.87	188.18	0.7	---	---	---	---
73	411	412	110.0	98.47	PEAD/PN10	8	17.42	1.09	188.18	186.46	1.72	185.2	160.2	26.26	1.26
74	18	413	200.0	2	PEAD/PN10	24	5.55	0.98	211.48	211.47	0.01	---	---	---	---
74	413	414	160.0	56.18	PEAD/PN10	24	20.81	1.54	211.47	210.3	1.17	---	---	---	---
74	414	415	160.0	36.28	PEAD/PN10	24	20.81	1.54	210.3	209.55	0.75	---	---	---	---
74	415	416	160.0	48.78	PEAD/PN10	24	20.81	1.54	209.55	208.53	1.01	---	---	---	---
74	416	417	160.0	128.52	PEAD/PN10	24	20.81	1.54	208.53	205.86	2.67	---	---	---	---
74	417	418	160.0	113.47	PEAD/PN10	24	20.81	1.54	205.86	203.5	2.36	---	---	---	---
74	418	419	160.0	148.17	PEAD/PN10	24	20.81	1.54	203.5	200.42	3.08	---	---	---	---
74	419	420	160.0	59.04	PEAD/PN10	24	20.81	1.54	200.42	199.19	1.23	---	---	---	---
74	420	421	125.0	94.59	PEAD/PN10	16	34.67	1.68	199.19	195.91	3.28	---	---	---	---
74	421	422	110.0	106.31	PEAD/PN10	8	17.42	1.09	195.91	194.06	1.85	186	161	33.06	8.06
74	415	423	110.0	37.74	PEAD/PN10	8	17.42	1.09	209.55	208.89	0.66	193	173	35.89	15.89
74	416	424	110.0	36.09	PEAD/PN10	8	17.42	1.09	208.53	207.9	0.63	191.2	171.2	36.7	16.7
74	417	425	110.0	31.01	PEAD/PN10	8	17.42	1.09	205.86	205.32	0.54	194.4	169.4	35.92	10.92
74	420	426	110.0	8.43	PEAD/PN10	8	17.42	1.09	199.19	199.04	0.15	190.2	170.2	28.84	8.84

Consorzio di Bonifica n.2 - Palermo

"Ammodernamento della rete irrigua dello Jato – I lotto sotto sollevamento" - Progetto Definitivo

Relazione dei calcoli idraulici

74	413	427	200.0	66.51	PEAD/PN10	24	5.55	0.98	211.47	211.1	0.37	---	---	---	---
74	427	428	200.0	94.79	PEAD/PN10	24	5.55	0.98	211.1	210.58	0.53	---	---	---	---
74	428	429	200.0	134.63	PEAD/PN10	24	5.55	0.98	210.58	209.83	0.75	---	---	---	---
74	429	430	160.0	27.28	PEAD/PN10	24	20.81	1.54	209.83	209.26	0.57	---	---	---	---
74	430	431	160.0	59.53	PEAD/PN10	24	20.81	1.54	209.26	208.02	1.24	---	---	---	---
74	431	432	160.0	78.85	PEAD/PN10	24	20.81	1.54	208.02	206.38	1.64	---	---	---	---
74	432	433	160.0	57.79	PEAD/PN10	24	20.81	1.54	206.38	205.18	1.2	---	---	---	---
74	433	434	160.0	58.02	PEAD/PN10	24	20.81	1.54	205.18	203.97	1.21	---	---	---	---
74	434	435	160.0	38.69	PEAD/PN10	24	20.81	1.54	203.97	203.17	0.8	---	---	---	---
74	435	436	160.0	42.94	PEAD/PN10	24	20.81	1.54	203.17	202.28	0.89	---	---	---	---
74	436	437	125.0	25.98	PEAD/PN10	16	34.67	1.68	202.28	201.38	0.9	---	---	---	---
74	437	438	110.0	141.33	PEAD/PN10	8	17.42	1.09	201.38	198.91	2.46	185	160	38.91	13.91
74	430	439	110.0	64.31	PEAD/PN10	8	17.42	1.09	209.26	208.14	1.12	193.5	173.5	34.64	14.64
74	432	440	110.0	93	PEAD/PN10	8	17.42	1.09	206.38	204.76	1.62	190.1	170.1	34.66	14.66
74	433	441	110.0	98.55	PEAD/PN10	8	17.42	1.09	205.18	203.46	1.72	194.1	169.1	34.36	9.36
74	434	442	110.0	53.06	PEAD/PN10	8	17.42	1.09	203.97	203.05	0.92	191.3	171.3	31.75	11.75
74	435	443	110.0	19.19	PEAD/PN10	8	17.42	1.09	203.17	202.84	0.33	190.8	170.8	32.04	12.04
74	437	444	110.0	54.94	PEAD/PN10	8	17.42	1.09	201.38	200.42	0.96	194	169	31.42	6.42
74	429	445	160.0	36.36	PEAD/PN10	24	20.81	1.54	209.83	209.07	0.76	---	---	---	---
74	445	446	160.0	77.92	PEAD/PN10	24	20.81	1.54	209.07	207.45	1.62	---	---	---	---
74	446	447	160.0	77.81	PEAD/PN10	24	20.81	1.54	207.45	205.83	1.62	---	---	---	---
74	447	448	160.0	143.26	PEAD/PN10	24	20.81	1.54	205.83	202.85	2.98	---	---	---	---
74	448	449	160.0	111.25	PEAD/PN10	24	20.81	1.54	202.85	200.54	2.31	---	---	---	---
74	449	450	160.0	153.54	PEAD/PN10	24	20.81	1.54	200.54	197.34	3.19	---	---	---	---
74	450	451	160.0	11.14	PEAD/PN10	24	20.81	1.54	197.34	197.11	0.23	---	---	---	---
74	451	452	160.0	49.96	PEAD/PN10	24	20.81	1.54	197.11	196.07	1.04	---	---	---	---
74	452	453	125.0	44.07	PEAD/PN10	16	34.67	1.68	196.07	194.55	1.53	---	---	---	---
74	453	454	110.0	163.66	PEAD/PN10	8	17.42	1.09	194.55	191.69	2.85	187.2	162.2	29.49	4.49
74	427	455	110.0	19.39	PEAD/PN10	8	17.42	1.09	211.1	210.77	0.34	190.6	170.6	40.17	20.17
74	445	456	110.0	10.76	PEAD/PN10	8	17.42	1.09	209.07	208.89	0.19	190	170	38.89	18.89
74	446	457	110.0	27	PEAD/PN10	8	17.42	1.09	207.45	206.98	0.47	191.8	171.8	35.18	15.18
74	447	458	110.0	28.06	PEAD/PN10	8	17.42	1.09	205.83	205.35	0.49	192.2	172.2	33.15	13.15
74	448	459	110.0	74.86	PEAD/PN10	8	17.42	1.09	202.85	201.55	1.3	191.5	171.5	30.05	10.05
74	450	460	160.0	39.7	PEAD/PN10	24	20.81	1.54	197.34	196.52	0.83	---	---	---	---
74	460	461	140.0	30	PEAD/PN10	16	18.88	1.34	196.52	0.57	---	---	---	---	---
74	460	461	125.0	38.34	PEAD/PN10	16	34.67	1.68	195.95	194.62	1.33	---	---	---	---
74	461	462	110.0	71.34	PEAD/PN10	8	17.42	1.09	194.62	193.38	1.24	188.8	163.8	29.58	4.58
74	460	463	110.0	11.45	PEAD/PN10	8	17.42	1.09	196.52	196.32	0.2	194.2	169.2	27.12	2.12
74	461	464	110.0	64.47	PEAD/PN10	8	17.42	1.09	194.62	193.5	1.12	193.5	168.5	25	0
74	451	465	110.0	35.02	PEAD/PN10	8	17.42	1.09	197.11	196.5	0.61	192.8	167.8	28.7	3.7
74	452	466	110.0	39.13	PEAD/PN10	8	17.42	1.09	196.07	195.39	0.68	191.2	166.2	29.19	4.19
74	453	467	110.0	37.17	PEAD/PN10	8	17.42	1.09	194.55	193.9	0.65	189.8	164.8	29.1	4.1
74	449	468	160.0	3.69	PEAD/PN10	24	20.81	1.54	200.54	200.46	0.08	---	---	---	---
74	468	469	160.0	25.12	PEAD/PN10	24	20.81	1.54	200.46	199.94	0.52	---	---	---	---
74	469	470	160.0	53.17	PEAD/PN10	24	20.81	1.54	199.94	198.83	1.11	---	---	---	---
74	470	471	160.0	36.64	PEAD/PN10	24	20.81	1.54	198.83	198.07	0.76	---	---	---	---
74	471	472	160.0	51.8	PEAD/PN10	24	20.81	1.54	198.07	196.99	1.08	---	---	---	---
74	472	473	160.0	130.04	PEAD/PN10	24	20.81	1.54	196.99	194.29	2.71	---	---	---	---
74	473	474	160.0	26.16	PEAD/PN10	24	20.81	1.54	194.29	193.74	0.54	---	---	---	---
74	474	475	160.0	46.2	PEAD/PN10	24	20.81	1.54	193.74	192.78	0.96	---	---	---	---
74	475	476	160.0	30.9	PEAD/PN10	24	20.81	1.54	192.78	192.14	0.64	---	---	---	---
74	476	477	160.0	55.62	PEAD/PN10	24	20.81	1.54	192.14	190.98	1.16	---	---	---	---
74	477	478	125.0	37.55	PEAD/PN10	16	34.67	1.68	190.98	189.68	1.3	---	---	---	---
74	478	479	110.0	78.01	PEAD/PN10	8	17.42	1.09	189.68	188.32	1.36	181.8	156.8	31.52	6.52
74	468	480	110.0	28.66	PEAD/PN10	8	17.42	1.09	200.46	199.96	0.5	193.5	168.5	31.46	6.46
74	469	481	110.0	31.55	PEAD/PN10	8	17.42	1.09	199.94	199.39	0.55	193.5	168.5	30.89	5.89
74	470	482	110.0	113.55	PEAD/PN10	8	17.42	1.09	198.83	196.86	1.98	191	166	30.86	5.86
74	471	483	110.0	26.19	PEAD/PN10	8	17.42	1.09	198.07	197.61	0.46	191.9	166.9	30.71	5.71
74	472	484	110.0	23.68	PEAD/PN10	8	17.42	1.09	196.99	196.58	0.41	193.5	168.5	28.08	3.08
74	473	485	110.0	46.15	PEAD/PN10	8	17.42	1.09	194.29	193.48	0.8	193.4	168.4	25.08	0.08
74	473	486	110.0	15.56	PEAD/PN10	8	17.42	1.09	194.29	194.02	0.27	192.7	167.7	26.32	1.32
74	474	487	110.0	27.29	PEAD/PN10	8	17.42	1.09	193.74	193.27	0.48	192	167	26.27	1.27
74	475	488	110.0	82.99	PEAD/PN10	8	17.42	1.09	192.78	191.34	1.45	189	164	27.34	2.34
74	476	489	110.0	37.15	PEAD/PN10	8	17.42	1.09	192.14	191.49	0.65	191	166	25.49	0.49
74	478	490	110.0	63.22	PEAD/PN10	8	17.42	1.09	189.68	188.58	1.1	185.5	160.5	28.08	3.08
76	15	491	200.0	2	PEAD/PN10	24	5.55	0.98	215.06	215.05	0.01	---	---	---	---
76	491	492	160.0	69.62	PEAD/PN10	24	20.81	1.54	215.05	213.6	1.45	---	---	---	---
76	492	493	160.0	38.97	PEAD/PN10	24	20.81	1.54	213.6	212.79	0.81	---	---	---	---
76	493	494	160.0	63.91	PEAD/PN10	24	20.81	1.54	212.79	211.46	1.33	---	---	---	---
76	494	495	125.0	34	PEAD/PN10	16	34.67	1.68	211.46	210.28	1.18	---	---	---	---
76	495	496	110.0	86.69	PEAD/PN10	8	17.42	1.09	210.28	208.77	1.51	---	---	---	---
76	496	497	110.0	92.84	PEAD/PN10	8	17.42	1.09	208.77	207.15	1.62	199.5	179.5	27.65	7.65
76	492	498	110.0	29.43	PEAD/PN10	8	17.42	1.09	213.6	213.09	0.51	197.5	177.5	35.59	15.59
76	493	499	110.0	38.46	PEAD/PN10	8	17.42	1.09	212.79	212.12	0.67	197.8	177.8	34.32	14.32
76	494	500	110.0	18.93	PEAD/PN10	8	17.42	1.09	211.46	211.13	0.33	198.3	178.3	32.83	12.83

Consorzio di Bonifica n.2 - Palermo

"Ammodernamento della rete irrigua dello Jato – I lotto sotto sollevamento" - Progetto Definitivo

Relazione dei calcoli idraulici

76	495	501	110.0	40.93	PEAD/PN10	8	17.42	1.09	210.28	209.57	0.71	198.5	178.5	31.07	11.07
76	491	502	200.0	45.86	PEAD/PN10	24	5.55	0.98	215.05	214.79	0.25	---	---	---	---
76	502	503	110.0	86.58	PEAD/PN10	8	17.42	1.09	214.79	213.29	1.51	193.5	173.5	39.79	19.79
76	502	504	110.0	44.78	PEAD/PN10	8	17.42	1.09	214.79	214.01	0.78	192.3	172.3	41.71	21.71
76	502	505	200.0	84.31	PEAD/PN10	24	5.55	0.98	214.79	214.33	0.47	---	---	---	---
76	505	506	200.0	139.96	PEAD/PN10	24	5.55	0.98	214.33	213.55	0.78	---	---	---	---
76	506	507	200.0	112.73	PEAD/PN10	24	5.55	0.98	213.55	212.92	0.63	---	---	---	---
76	507	508	200.0	10	PEAD/PN10	24	5.55	0.98	212.92	---	0.06	---	---	---	---
76	507	508	160.0	33.17	PEAD/PN10	24	20.81	1.54	212.87	212.18	0.69	---	---	---	---
76	508	509	160.0	97.95	PEAD/PN10	24	20.81	1.54	212.18	210.14	2.04	---	---	---	---
76	509	510	160.0	96.02	PEAD/PN10	24	20.81	1.54	210.14	208.14	2	---	---	---	---
76	510	511	125.0	42.61	PEAD/PN10	16	34.67	1.68	208.14	206.67	1.48	---	---	---	---
76	511	512	110.0	28.92	PEAD/PN10	8	17.42	1.09	206.67	206.16	0.5	192.5	172.5	33.66	13.66
76	511	513	110.0	102.47	PEAD/PN10	8	17.42	1.09	206.67	204.88	1.78	190	170	34.88	14.88
76	510	514	160.0	30.36	PEAD/PN10	24	20.81	1.54	208.14	207.51	0.63	---	---	---	---
76	514	515	160.0	30.36	PEAD/PN10	24	20.81	1.54	207.51	206.88	0.63	---	---	---	---
76	515	516	160.0	115.25	PEAD/PN10	24	20.81	1.54	206.88	204.48	2.4	---	---	---	---
76	516	517	160.0	39.33	PEAD/PN10	24	20.81	1.54	204.48	203.66	0.82	---	---	---	---
76	517	518	160.0	81.49	PEAD/PN10	24	20.81	1.54	203.66	201.97	1.7	---	---	---	---
76	518	519	160.0	68.85	PEAD/PN10	24	20.81	1.54	201.97	200.54	1.43	---	---	---	---
76	519	520	125.0	73.51	PEAD/PN10	16	34.67	1.68	200.54	197.99	2.55	---	---	---	---
76	520	521	110.0	54.24	PEAD/PN10	8	17.42	1.09	197.99	197.04	0.94	194.1	174.1	22.94	2.94
76	520	522	110.0	96.24	PEAD/PN10	8	17.42	1.09	197.99	196.31	1.68	194.5	169.5	26.81	1.81
76	519	523	160.0	86.2	PEAD/PN10	24	20.81	1.54	200.54	198.74	1.79	---	---	---	---
76	523	524	160.0	60	PEAD/PN10	24	20.81	1.54	198.74	197.49	1.25	---	---	---	---
76	524	525	160.0	24.22	PEAD/PN10	24	20.81	1.54	197.49	196.99	0.5	---	---	---	---
76	525	526	160.0	67.54	PEAD/PN10	24	20.81	1.54	196.99	195.58	1.41	---	---	---	---
76	526	527	140.0	30.74	PEAD/PN10	16	18.88	1.34	195.58	195	0.58	---	---	---	---
76	527	528	110.0	71.26	PEAD/PN10	8	17.42	1.09	195	193.76	1.24	193.7	173.7	20.06	0.06
76	505	529	110.0	37.73	PEAD/PN10	8	17.42	1.09	214.33	213.67	0.66	190.5	170.5	43.17	23.17
76	507	530	110.0	23.3	PEAD/PN10	8	17.42	1.09	212.92	212.52	0.41	191.8	171.8	40.72	20.72
76	508	531	110.0	28.51	PEAD/PN10	8	17.42	1.09	212.18	211.68	0.5	192.5	172.5	39.18	19.18
76	514	532	110.0	26.52	PEAD/PN10	8	17.42	1.09	207.51	207.05	0.46	196	176	31.05	11.05
76	515	533	110.0	31.9	PEAD/PN10	8	17.42	1.09	206.88	206.32	0.56	193.4	173.4	32.92	12.92
76	516	534	110.0	29.09	PEAD/PN10	8	17.42	1.09	204.48	203.97	0.51	191.5	171.5	32.47	12.47
76	517	535	110.0	97.01	PEAD/PN10	8	17.42	1.09	203.66	201.97	1.69	196.5	176.5	25.47	5.47
76	518	536	110.0	23.29	PEAD/PN10	8	17.42	1.09	201.97	201.56	0.41	197.2	177.2	24.36	4.36
76	523	537	110.0	64.69	PEAD/PN10	8	17.42	1.09	198.74	197.62	1.13	194.5	174.5	23.12	3.12
76	524	538	110.0	54.41	PEAD/PN10	8	17.42	1.09	197.49	196.55	0.95	195.8	175.8	20.75	0.75
76	525	539	110.0	57.12	PEAD/PN10	8	17.42	1.09	196.99	195.99	0.99	194.5	169.5	26.49	1.49
76	527	540	125.0	24.24	PEAD/PN10	8	8.67	0.84	195	194.79	0.21	194.8	174.8	19.99	-0.01
76	526	541	110.0	69.1	PEAD/PN10	8	17.42	1.09	195.58	194.38	1.2	193	173	21.38	1.38
76	509	542	160.0	49.98	PEAD/PN10	24	20.81	1.54	210.14	209.1	1.04	---	---	---	---
76	542	543	160.0	45.95	PEAD/PN10	24	20.81	1.54	209.1	208.14	0.96	---	---	---	---
76	543	544	160.0	39.66	PEAD/PN10	24	20.81	1.54	208.14	207.32	0.83	---	---	---	---
76	544	545	160.0	5.28	PEAD/PN10	24	20.81	1.54	207.32	207.21	0.11	---	---	---	---
76	545	546	160.0	47.93	PEAD/PN10	24	20.81	1.54	207.21	206.21	1	---	---	---	---
76	546	547	160.0	84.02	PEAD/PN10	24	20.81	1.54	206.21	204.46	1.75	---	---	---	---
76	547	548	125.0	95.41	PEAD/PN10	16	34.67	1.68	204.46	201.16	3.31	---	---	---	---
76	548	549	110.0	88.75	PEAD/PN10	8	17.42	1.09	201.16	199.61	1.55	197.8	177.8	21.81	1.81
76	543	550	110.0	10.12	PEAD/PN10	8	17.42	1.09	208.14	207.97	0.18	199	179	28.97	8.97
76	544	551	110.0	52.75	PEAD/PN10	8	17.42	1.09	207.32	206.4	0.92	199	179	27.4	7.4
76	545	552	110.0	27.24	PEAD/PN10	8	17.42	1.09	207.21	206.74	0.47	198.2	178.2	28.54	8.54
76	546	553	110.0	36.92	PEAD/PN10	8	17.42	1.09	206.21	205.57	0.64	196.5	176.5	29.07	9.07
76	547	554	110.0	32.48	PEAD/PN10	8	17.42	1.09	204.46	203.9	0.57	194.2	169.2	34.7	9.7
76	548	555	110.0	29.75	PEAD/PN10	8	17.42	1.09	201.16	200.64	0.52	194.2	174.2	26.44	6.44

Consorzio di Bonifica n.2 - Palermo

“Ammodernamento della rete irrigua dello Jato – I lotto sotto sollevamento” - Progetto Definitivo
Relazione dei calcoli idraulici

Risultati dei calcoli di ottimizzazione della rete di distribuzione a valle della Derivazione D

Consorzio di Bonifica n.2 - Palermo

"Ammodernamento della rete irrigua dello Jato – I lotto sotto sollevamento" - Progetto Definitivo
Relazione dei calcoli idraulici

COMIZIO	NODO MONTE	NODO VALLE	DIAMETRO	LUNG.	TIPO TUBAZIONE	PORTATA	PEND. PIEZ.	VEL.	QUOTA MONTE	QUOTA VALLE	PERDITA CARICO	QUOTA IMPOSTA	QUOTA TERRENO	PRESSIONE
			(mm)	(m)		(l/sec)	(m/Km)	(m/sec)	(ms.m.)	(ms.m.)	(m)	(ms.m.)	(ms.m.)	(m)
RIP-D1	0	1	250	3	PEAD/PN10	40	4.66	1.04	219.14	219.13	0.01	---	---	---
RIP-D1	1	2	250	121.26	PEAD/PN10	24	1.68	0.62	219.13	218.92	0.2	---	---	---
RIP-D2	2	3	200	11.76	PEAD/PN10	16	2.47	0.66	218.92	218.89	0.03	---	---	---
79	2	4	250	2	PEAD/PN10	24	1.68	0.62	218.92	218.92	0	---	---	---
79	4	5	160	31.31	PEAD/PN10	24	20.81	1.54	218.92	218.27	0.65	---	---	---
79	5	6	160	57.93	PEAD/PN10	24	20.81	1.54	218.27	217.06	1.21	---	---	---
79	6	7	125	46.31	PEAD/PN10	16	34.67	1.68	217.06	215.46	1.61	---	---	---
79	7	8	110	67.55	PEAD/PN10	8	17.42	1.09	215.46	214.28	1.18	---	---	---
79	8	9	110	12.9	PEAD/PN10	8	17.42	1.09	214.28	214.06	0.22	212	192	22.06
79	7	10	110	36.29	PEAD/PN10	8	17.42	1.09	215.46	214.83	0.63	214.8	194.8	20.03
79	6	11	160	62.79	PEAD/PN10	24	20.81	1.54	217.06	215.76	1.31	---	---	---
79	11	12	125	99.1	PEAD/PN10	16	34.67	1.68	215.76	212.32	3.44	---	---	---
79	12	13	110	106.31	PEAD/PN10	8	17.42	1.09	212.32	210.47	1.85	202.5	182.5	27.97
79	5	14	110	16.16	PEAD/PN10	8	17.42	1.09	218.27	217.99	0.28	216.4	196.4	21.59
79	6	15	110	20.93	PEAD/PN10	8	17.42	1.09	217.06	216.7	0.36	215	195	21.7
79	11	16	110	21.89	PEAD/PN10	8	17.42	1.09	215.76	215.38	0.38	211	191	24.38
79	12	17	110	56.2	PEAD/PN10	8	17.42	1.09	212.32	211.34	0.98	209.5	189.5	21.84
79	4	18	250	63.37	PEAD/PN10	24	1.68	0.62	218.92	218.81	0.11	---	---	---
79	18	19	250	63.79	PEAD/PN10	24	1.68	0.62	218.81	218.71	0.11	---	---	---
79	19	20	250	121.85	PEAD/PN10	24	1.68	0.62	218.71	218.5	0.2	---	---	---
79	20	21	250	66.26	PEAD/PN10	24	1.68	0.62	218.5	218.39	0.11	---	---	---
79	21	22	250	21	PEAD/PN10	24	1.68	0.62	218.39	---	0.04	---	---	---
79	21	22	200	48.96	PEAD/PN10	24	5.55	0.98	218.36	218.08	0.27	---	---	---
79	22	23	200	31.84	PEAD/PN10	24	5.55	0.98	218.08	217.91	0.18	---	---	---
79	23	24	200	69.58	PEAD/PN10	24	5.55	0.98	217.91	217.52	0.39	---	---	---
79	24	25	200	20.14	PEAD/PN10	24	5.55	0.98	217.52	217.41	0.11	---	---	---
79	25	26	200	43.88	PEAD/PN10	24	5.55	0.98	217.41	217.17	0.24	---	---	---
79	26	27	200	148.16	PEAD/PN10	24	5.55	0.98	217.17	216.34	0.82	---	---	---
79	27	28	200	51.15	PEAD/PN10	24	5.55	0.98	216.34	216.06	0.28	---	---	---
79	28	29	160	133.1	PEAD/PN10	24	20.81	1.54	216.06	213.29	2.77	---	---	---
79	29	30	160	55.47	PEAD/PN10	24	20.81	1.54	213.29	212.14	1.15	---	---	---
79	30	31	160	140.69	PEAD/PN10	24	20.81	1.54	212.14	209.21	2.93	---	---	---
79	31	32	160	74.23	PEAD/PN10	24	20.81	1.54	209.21	207.67	1.54	---	---	---
79	32	33	160	100.71	PEAD/PN10	24	20.81	1.54	207.67	205.57	2.1	---	---	---
79	33	34	160	90.15	PEAD/PN10	24	20.81	1.54	205.57	203.7	1.88	---	---	---
79	34	35	160	63.1	PEAD/PN10	24	20.81	1.54	203.7	202.38	1.31	---	---	---
79	35	36	160	49.16	PEAD/PN10	24	20.81	1.54	202.38	201.36	1.02	---	---	---
79	36	37	160	78.13	PEAD/PN10	24	20.81	1.54	201.36	199.73	1.63	---	---	---
79	37	38	160	65.62	PEAD/PN10	24	20.81	1.54	199.73	198.37	1.37	---	---	---
79	38	39	160	44.46	PEAD/PN10	24	20.81	1.54	198.37	197.44	0.93	---	---	---
79	39	40	140	23	PEAD/PN10	16	18.88	1.34	197.44	---	0.43	---	---	---
79	39	40	125	73.97	PEAD/PN10	16	34.67	1.68	197.01	194.45	2.56	---	---	---
79	40	41	110	62.74	PEAD/PN10	8	17.42	1.09	194.45	193.35	1.09	186.8	161.8	31.55
79	18	42	110	43.22	PEAD/PN10	8	17.42	1.09	218.81	218.06	0.75	216.9	196.9	21.16
79	19	43	110	45.81	PEAD/PN10	8	17.42	1.09	218.71	217.91	0.8	215.5	195.5	22.41
79	20	44	200	33.51	PEAD/PN10	16	2.47	0.66	218.5	218.42	0.08	---	---	---
79	44	45	160	23	PEAD/PN10	8	2.28	0.51	218.42	---	0.05	---	---	---
79	44	45	140	77.43	PEAD/PN10	8	4.74	0.67	218.37	218	0.37	218	200.3	17.7
79	22	46	160	37.13	PEAD/PN10	8	2.31	0.51	218.08	218	0.09	218	198	20
79	23	47	110	52.25	PEAD/PN10	8	17.42	1.09	217.91	217	0.91	216.5	196.5	20.5
79	24	48	110	106.43	PEAD/PN10	8	17.42	1.09	217.52	215.67	1.85	211.6	191.6	24.07
79	27	49	110	22.26	PEAD/PN10	8	17.42	1.09	216.34	215.96	0.39	210.4	190.4	25.56
79	28	50	110	39.9	PEAD/PN10	8	17.42	1.09	216.06	215.37	0.69	209.5	189.5	25.87
79	29	51	110	134.25	PEAD/PN10	8	17.42	1.09	213.29	210.95	2.34	208.5	188.5	22.45
79	31	52	110	41.42	PEAD/PN10	8	17.42	1.09	209.21	208.49	0.72	206	186	22.49
79	32	53	160	28.25	PEAD/PN10	24	20.81	1.54	207.67	207.08	0.59	---	---	---
79	53	54	160	80.35	PEAD/PN10	24	20.81	1.54	207.08	205.41	1.67	---	---	---
79	54	55	160	48.46	PEAD/PN10	24	20.81	1.54	205.41	204.4	1.01	---	---	---
79	55	56	125	41.72	PEAD/PN10	16	34.67	1.68	204.4	202.95	1.45	---	---	---
79	56	57	110	57.86	PEAD/PN10	8	17.42	1.09	202.95	201.94	1.01	199.5	179.5	22.44
79	53	58	110	39.52	PEAD/PN10	8	17.42	1.09	207.08	206.39	0.69	206.3	186.3	20.09
79	54	59	110	29.31	PEAD/PN10	8	17.42	1.09	205.41	204.9	0.51	204.2	184.2	20.7
79	55	60	110	33.35	PEAD/PN10	8	17.42	1.09	204.4	203.82	0.58	201.8	181.8	22.02
79	56	61	110	59.39	PEAD/PN10	8	17.42	1.09	202.95	201.92	1.03	197.5	177.5	24.42
79	33	62	110	44.32	PEAD/PN10	8	17.42	1.09	205.57	204.8	0.77	196.5	176.5	28.3
79	34	63	110	31.22	PEAD/PN10	8	17.42	1.09	203.7	203.15	0.54	202.9	182.9	20.25
79	35	64	110	22.12	PEAD/PN10	8	17.42	1.09	202.38	202	0.39	199	179	23
79	36	65	110	34.67	PEAD/PN10	8	17.42	1.09	201.36	200.76	0.6	195.1	175.1	25.66
79	37	66	110	24.75	PEAD/PN10	8	17.42	1.09	199.73	199.3	0.43	190	170	29.3
79	38	67	110	38.73	PEAD/PN10	8	17.42	1.09	198.37	197.69	0.67	191	171	26.69
79	39	68	110	20.11	PEAD/PN10	8	17.42	1.09	197.44	197.09	0.35	194	169	28.09
79	40	69	110	20.18	PEAD/PN10	8	17.42	1.09	194.45	194.09	0.35	194.1	169.1	24.99
79	21	70	200	75	PEAD/PN10	24	5.55	0.98	218.39	---	0.42	---	---	---

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79	21	70	160	74.53	PEAD/PN10	24	20.81	1.54	217.97	216.42	1.55	---	---	---	---
79	70	71	160	99.79	PEAD/PN10	24	20.81	1.54	216.42	214.35	2.08	---	---	---	---
79	71	72	160	91.14	PEAD/PN10	24	20.81	1.54	214.35	212.45	1.9	---	---	---	---
79	72	73	125	83.85	PEAD/PN10	16	34.67	1.68	212.45	209.55	2.91	---	---	---	---
79	73	74	110	128.51	PEAD/PN10	8	17.42	1.09	209.55	207.31	2.24	203.8	183.8	23.51	3.51
79	70	75	125	49.15	PEAD/PN10	8	8.67	0.84	216.42	216	0.43	216	196	20	0
80	3	76	200	2	PEAD/PN10	16	2.47	0.66	218.89	218.89	0	---	---	---	---
80	76	77	200	57.5	PEAD/PN10	16	2.47	0.66	218.89	218.75	0.14	---	---	---	---
80	77	78	110	42.89	PEAD/PN10	8	17.42	1.09	218.75	218	0.75	214.5	194.5	23.5	3.5
80	77	79	200	77.23	PEAD/PN10	16	2.47	0.66	218.75	218.56	0.19	---	---	---	---
80	79	80	200	43.97	PEAD/PN10	16	2.47	0.66	218.56	218.45	0.11	---	---	---	---
80	80	81	200	81.89	PEAD/PN10	16	2.47	0.66	218.45	218.25	0.2	---	---	---	---
80	81	82	200	76.51	PEAD/PN10	16	2.47	0.66	218.25	218.06	0.19	---	---	---	---
80	82	83	200	25.49	PEAD/PN10	16	2.47	0.66	218.06	217.99	0.06	---	---	---	---
80	83	84	200	55.35	PEAD/PN10	16	2.47	0.66	217.99	217.86	0.14	---	---	---	---
80	84	85	200	83.92	PEAD/PN10	16	2.47	0.66	217.86	217.65	0.21	---	---	---	---
80	85	86	200	57.69	PEAD/PN10	16	2.47	0.66	217.65	217.51	0.14	---	---	---	---
80	86	87	200	18.78	PEAD/PN10	16	2.47	0.66	217.51	217.46	0.05	---	---	---	---
80	87	88	200	154.01	PEAD/PN10	16	2.47	0.66	217.46	217.08	0.38	---	---	---	---
80	88	89	200	29.64	PEAD/PN10	16	2.47	0.66	217.08	217.01	0.07	---	---	---	---
80	89	90	200	41.74	PEAD/PN10	16	2.47	0.66	217.01	216.91	0.1	---	---	---	---
80	90	91	200	141.33	PEAD/PN10	16	2.47	0.66	216.91	216.56	0.35	---	---	---	---
80	91	92	200	148.22	PEAD/PN10	16	2.47	0.66	216.56	216.19	0.37	---	---	---	---
80	92	93	200	38.19	PEAD/PN10	16	2.47	0.66	216.19	216.1	0.09	---	---	---	---
80	93	94	200	94.72	PEAD/PN10	16	2.47	0.66	216.1	215.87	0.23	---	---	---	---
80	94	95	160	52.66	PEAD/PN10	16	9.25	1.02	215.87	215.38	0.49	---	---	---	---
80	95	96	160	17	PEAD/PN10	8	2.26	0.51	215.38		0.04				
80	95	96	140	71.76	PEAD/PN10	8	4.75	0.67	215.34	215	0.34	215	200.4	14.6	
80	77	97	110	19.66	PEAD/PN10	8	17.42	1.09	218.75	218.4	0.34	215.5	195.5	22.9	2.9
80	86	98	200	241.68	PEAD/PN10	16	2.47	0.66	217.51	216.91	0.6	---	---	---	---
80	98	99	160	56.63	PEAD/PN10	16	9.25	1.02	216.91	216.39	0.52	---	---	---	---
80	99	100	125	41.24	PEAD/PN10	8	8.67	0.84	216.39	216.03	0.36	216	197.8	18.23	0.03
80	99	101	160	50	PEAD/PN10	8	2.3	0.51	216.39		0.11				
80	99	101	140	57.98	PEAD/PN10	8	4.74	0.67	216.27	216	0.27	216	197.2	18.8	
80	98	102	110	12.56	PEAD/PN10	8	17.42	1.09	216.91	216.69	0.22	216	200.5	16.19	0.69
80	88	103	140	13.42	PEAD/PN10	8	4.72	0.67	217.08	217.02	0.06	217	203.5	13.52	0.02
80	89	104	200	38.2	PEAD/PN10	16	2.47	0.66	217.01	216.92	0.09	---	---	---	---
80	104	105	200	104.14	PEAD/PN10	16	2.47	0.66	216.92	216.66	0.26	---	---	---	---
80	105	106	200	24	PEAD/PN10	16	2.47	0.66	216.66		0.06				
80	105	106	160	30.69	PEAD/PN10	16	9.25	1.02	216.6	216.32	0.28	---	---	---	---
80	106	107	160	137.05	PEAD/PN10	8	2.31	0.51	216.32	216	0.32	216	196.5	19.5	0
80	104	108	110	23.4	PEAD/PN10	8	17.42	1.09	216.92	216.51	0.41	216	204.4	12.11	0.51
80	105	109	110	11.53	PEAD/PN10	8	17.42	1.09	216.66	216.46	0.2	216	201.5	14.96	0.46
80	106	110	110	11.94	PEAD/PN10	8	17.42	1.09	216.32	216.11	0.21	216	200.4	15.71	0.11
80	90	111	110	12.83	PEAD/PN10	8	17.42	1.09	216.91	216.68	0.22	216	204.5	12.18	0.68
80	93	112	160	21.4	PEAD/PN10	8	2.31	0.51	216.1	216.05	0.05	216	204.2	11.85	0.05
80	94	113	110	23.0	PEAD/PN10	8	17.42	1.09	215.87	215.47	0.4	215	202.2	13.27	0.47
80	95	114	140	34.0	PEAD/PN10	8	4.66	0.67	215.38		0.16				
80	95	114	125	25.0	PEAD/PN10	8	8.82	0.84	215.22	215	0.22	215	198	17	
80	92	115	160	26.0	PEAD/PN10	16	9.25	1.02	216.19		0.24				
80	92	115	140	12.0	PEAD/PN10	16	18.88	1.34	215.95	215.73	0.23	---	---	---	---
80	115	116	200	109.9	PEAD/PN10	16	2.47	0.66	215.73	215.45	0.27	---	---	---	---
80	116	117	125	52.6	PEAD/PN10	8	8.67	0.84	215.45	215	0.46	215	201	14	0

Consorzio di Bonifica n.2 - Palermo

“Ammodernamento della rete irrigua dello Jato – I lotto sotto sollevamento” - Progetto Definitivo
Relazione dei calcoli idraulici

Risultati dei calcoli di ottimizzazione della rete di distribuzione a valle della Derivazione E

Consorzio di Bonifica n.2 - Palermo

"Ammodernamento della rete irrigua dello Jato – I lotto sotto sollevamento" - Progetto Definitivo
Relazione dei calcoli idraulici

COMIZIO	NODO MONTE	NODO VALLE	DIAMETRO	LUNG.	TIPO TUBAZIONE	PORTATA	PEND. PIEZ.	VEL.	QUOTA MONTE	QUOTA VALLE	PERDITA CARICO	QUOTA IMPOSTA	QUOTA TERRENO	PRESSIONE	CARICO RESIDUO
			(mm)	(m)		(l/sec)	(m/Km)	(m/sec)	(ms.m.)	(ms.m.)	(m)	(ms.m.)	(ms.m.)	(m)	(m)
RIP-E1	0	1	400	3	PEAD/PN10	152	5.85	1.56	218.01	217.99	0.02	---	---	---	---
RIP-E1	1	2	400	123.01	PEAD/PN10	128	4.15	1.31	217.99	217.48	0.51	---	---	---	---
RIP-E1	2	3	400	57.04	PEAD/PN10	104	2.74	1.07	217.48	217.33	0.16	---	---	---	---
RIP-E1	3	4	355	243.18	PEAD/PN10	80	3.03	1.04	217.33	216.59	0.74	---	---	---	---
RIP-E1	4	5	355	91	PEAD/PN10	80	3.03	1.04	216.59		0.28	---	---	---	---
RIP-E1	4	5	315	108.41	PEAD/PN10	80	5.66	1.32	216.31	215.7	0.61	---	---	---	---
RIP-E1	5	6	315	275.99	PEAD/PN10	56	2.77	0.93	215.7	214.94	0.77	---	---	---	---
RIP-E1	6	7	200	515.44	PEAD/PN10	32	9.86	1.31	214.94	209.85	5.08	---	---	---	---
RIP-E2	1	8	250	15.49	PEAD/PN10	24	1.68	0.62	217.99	217.97	0.03	---	---	---	---
RIP-E3	2	9	200	383.43	PEAD/PN10	24	5.55	0.98	217.48	215.36	2.13	---	---	---	---
RIP-E4	6	10	250	152.87	PEAD/PN10	24	1.68	0.62	214.94	214.68	0.26	---	---	---	---
84	8	11	250	2	PEAD/PN10	24	1.68	0.62	217.97	217.96	0	---	---	---	---
84	11	12	250	31.45	PEAD/PN10	24	1.68	0.62	217.96	217.91	0.05	---	---	---	---
84	12	13	250	30.31	PEAD/PN10	24	1.68	0.62	217.91	217.86	0.05	---	---	---	---
84	13	14	250	60.74	PEAD/PN10	24	1.68	0.62	217.86	217.76	0.1	---	---	---	---
84	14	15	250	71.19	PEAD/PN10	24	1.68	0.62	217.76	217.64	0.12	---	---	---	---
84	15	16	250	53.25	PEAD/PN10	24	1.68	0.62	217.64	217.55	0.09	---	---	---	---
84	16	17	250	95.7	PEAD/PN10	24	1.68	0.62	217.55	217.39	0.16	---	---	---	---
84	17	18	250	48.95	PEAD/PN10	24	1.68	0.62	217.39	217.31	0.08	---	---	---	---
84	18	19	250	50.25	PEAD/PN10	24	1.68	0.62	217.31	217.22	0.08	---	---	---	---
84	19	20	250	242.11	PEAD/PN10	24	1.68	0.62	217.22	216.82	0.41	---	---	---	---
84	20	21	250	80.05	PEAD/PN10	24	1.68	0.62	216.82	216.68	0.13	---	---	---	---
84	21	22	250	183.76	PEAD/PN10	24	1.68	0.62	216.68	216.37	0.31	---	---	---	---
84	22	23	250	80.31	PEAD/PN10	24	1.68	0.62	216.37	216.24	0.13	---	---	---	---
84	23	24	250	187.88	PEAD/PN10	24	1.68	0.62	216.24	215.93	0.31	---	---	---	---
84	24	25	250	51.03	PEAD/PN10	24	1.68	0.62	215.93	215.84	0.09	---	---	---	---
84	25	26	250	95.21	PEAD/PN10	24	1.68	0.62	215.84	215.68	0.16	---	---	---	---
84	26	27	250	101.37	PEAD/PN10	24	1.68	0.62	215.68	215.51	0.17	---	---	---	---
84	27	28	250	66.77	PEAD/PN10	24	1.68	0.62	215.51	215.4	0.11	---	---	---	---
84	28	29	250	82.86	PEAD/PN10	24	1.68	0.62	215.4	215.26	0.14	---	---	---	---
84	29	30	250	121.71	PEAD/PN10	24	1.68	0.62	215.26	215.06	0.2	---	---	---	---
84	30	31	250	45.13	PEAD/PN10	24	1.68	0.62	215.06	214.98	0.08	---	---	---	---
84	31	32	250	62.21	PEAD/PN10	24	1.68	0.62	214.98	214.88	0.1	---	---	---	---
84	32	33	250	71.09	PEAD/PN10	24	1.68	0.62	214.88	214.76	0.12	---	---	---	---
84	33	34	250	406	PEAD/PN10	24	1.68	0.62	214.76		0.68	---	---	---	---
84	33	34	200	51.79	PEAD/PN10	24	5.56	0.98	214.08	213.79	0.29	---	---	---	---
84	34	35	200	24.38	PEAD/PN10	24	5.55	0.98	213.79	213.65	0.14	---	---	---	---
84	35	36	200	29.42	PEAD/PN10	16	2.47	0.66	213.65	213.58	0.07	---	---	---	---
84	36	37	160	34.71	PEAD/PN10	8	2.31	0.51	213.58	213.5	0.08	213.5	213	0.5	0
84	12	38	110	90.81	PEAD/PN10	8	17.42	1.09	217.91	216.33	1.58	214.5	194.5	21.83	1.83
84	16	39	125	19	PEAD/PN10	8	8.49	0.84	217.55		0.16	---	---	---	---
84	16	39	110	21.89	PEAD/PN10	8	17.72	1.09	217.39	217	0.39	217	199	18	---
84	17	40	125	23	PEAD/PN10	8	8.67	0.84	217.39		0.2	---	---	---	---
84	17	40	110	10.89	PEAD/PN10	8	17.42	1.09	217.19	217	0.19	217	198.5	18.5	---
84	18	41	125	5.92	PEAD/PN10	16	34.67	1.68	217.31	217.1	0.21	---	---	---	---
84	41	42	110	177.49	PEAD/PN10	8	17.42	1.09	217.1	214.01	3.09	209.9	189.9	24.11	4.11
84	41	43	110	96.53	PEAD/PN10	8	17.42	1.09	217.1	215.42	1.68	215	195	20.42	0.42
84	19	44	160	93.78	PEAD/PN10	8	2.31	0.51	217.22	217.01	0.22	217	199	18.01	0.01
84	23	45	110	37.52	PEAD/PN10	8	17.42	1.09	216.24	215.59	0.65	214.5	194.5	21.09	1.09
84	27	46	250	55	PEAD/PN10	24	1.68	0.62	215.51		0.09	---	---	---	---
84	27	46	200	9.82	PEAD/PN10	24	5.55	0.98	215.42	215.36	0.05	---	---	---	---
84	46	47	200	64.82	PEAD/PN10	16	2.47	0.66	215.36	215.2	0.16	---	---	---	---
84	47	48	160	88.83	PEAD/PN10	8	2.31	0.51	215.2	215	0.21	215	195.3	19.7	0
84	47	49	110	72.24	PEAD/PN10	8	17.42	1.09	215.2	213.95	1.26	211.5	191.5	22.45	2.45
84	46	50	125	7	PEAD/PN10	8	8.67	0.84	215.36		0.06	---	---	---	---
84	46	50	110	17.54	PEAD/PN10	8	17.42	1.09	215.3	215	0.31	215	199	16	---
84	27	51	110	11.43	PEAD/PN10	8	17.42	1.09	215.51	215.31	0.2	215	201.2	14.11	0.31
84	28	52	200	23	PEAD/PN10	16	2.47	0.66	215.4		0.06	---	---	---	---
84	28	52	160	31.63	PEAD/PN10	16	9.25	1.02	215.34	215.05	0.29	---	---	---	---
84	52	53	125	138	PEAD/PN10	8	8.67	0.84	215.05		1.2	---	---	---	---
84	52	53	110	20.37	PEAD/PN10	8	17.42	1.09	213.85	213.5	0.35	213.5	193.5	20	---
84	52	54	160	21.72	PEAD/PN10	8	2.31	0.51	215.05	215	0.05	215	200.2	14.8	0
84	29	55	110	10.95	PEAD/PN10	8	17.42	1.09	215.26	215.07	0.19	215	197.5	17.57	0.07
84	30	56	125	30	PEAD/PN10	8	8.62	0.84	215.06		0.26	---	---	---	---
84	30	56	110	16.87	PEAD/PN10	8	17.58	1.09	214.8	214.5	0.3	214.5	200	14.5	---
84	31	57	140	35	PEAD/PN10	8	4.72	0.67	214.98		0.17	---	---	---	---
84	31	57	125	36.49	PEAD/PN10	8	8.67	0.84	214.81	214.5	0.32	214.5	200.3	14.2	---
84	32	58	140	21	PEAD/PN10	8	4.72	0.67	214.88		0.1	---	---	---	---
84	32	58	125	31.93	PEAD/PN10	8	8.67	0.84	214.78	214.5	0.28	214.5	194.5	20	---
84	36	59	140	10.23	PEAD/PN10	8	4.72	0.67	213.58	213.53	0.05	213.5	213	0.53	0.03
84	13	60	110	46.18	PEAD/PN10	8	17.42	1.09	217.86	217.06	0.8	217	198.2	18.86	0.06
85	9	61	200	2	PEAD/PN10	24	5.55	0.98	215.36	215.34	0.01	---	---	---	---
85	61	62	200	78.99	PEAD/PN10	24	5.55	0.98	215.34	214.91	0.44	---	---	---	---

Consorzio di Bonifica n.2 - Palermo

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Relazione dei calcoli idraulici

85	62	63	200	61.14	PEAD/PN10	24	5.55	0.98	214.91	214.57	0.34	---	---	---	---
85	63	64	200	55.17	PEAD/PN10	24	5.55	0.98	214.57	214.26	0.31	---	---	---	---
85	64	65	200	132.76	PEAD/PN10	24	5.55	0.98	214.26	213.52	0.74	---	---	---	---
85	65	66	200	66.35	PEAD/PN10	24	5.55	0.98	213.52	213.16	0.37	---	---	---	---
85	66	67	200	83.95	PEAD/PN10	24	5.55	0.98	213.16	212.69	0.47	---	---	---	---
85	67	68	200	79.94	PEAD/PN10	24	5.55	0.98	212.69	212.25	0.44	---	---	---	---
85	68	69	200	29	PEAD/PN10	24	5.55	0.98	212.25	---	0.16	---	---	---	---
85	68	69	160	18.95	PEAD/PN10	24	20.81	1.54	212.09	211.69	0.39	---	---	---	---
85	69	70	160	71.84	PEAD/PN10	24	20.81	1.54	211.69	210.2	1.49	---	---	---	---
85	70	71	160	69.27	PEAD/PN10	24	20.81	1.54	210.2	208.76	1.44	---	---	---	---
85	71	72	160	47.41	PEAD/PN10	24	20.81	1.54	208.76	207.77	0.99	---	---	---	---
85	72	73	160	40.41	PEAD/PN10	24	20.81	1.54	207.77	206.93	0.84	---	---	---	---
85	73	74	160	95.31	PEAD/PN10	24	20.81	1.54	206.93	204.95	1.98	---	---	---	---
85	74	75	160	98.17	PEAD/PN10	24	20.81	1.54	204.95	202.9	2.04	---	---	---	---
85	75	76	160	43.8	PEAD/PN10	24	20.81	1.54	202.9	201.99	0.91	---	---	---	---
85	76	77	160	165.66	PEAD/PN10	24	20.81	1.54	201.99	198.55	3.45	---	---	---	---
85	77	78	160	83.51	PEAD/PN10	24	20.81	1.54	198.55	196.81	1.74	---	---	---	---
85	78	79	160	97.36	PEAD/PN10	24	20.81	1.54	196.81	194.78	2.03	---	---	---	---
85	79	80	160	5.19	PEAD/PN10	24	20.81	1.54	194.78	194.68	0.11	---	---	---	---
85	80	81	125	57.92	PEAD/PN10	16	34.67	1.68	194.68	192.67	2.01	---	---	---	---
85	81	82	110	132.68	PEAD/PN10	8	17.42	1.09	192.67	190.36	2.31	184.1	159.1	31.26	6.26
85	65	83	110	35.25	PEAD/PN10	8	17.42	1.09	213.52	212.91	0.61	206	186	26.91	6.91
85	66	84	110	39.46	PEAD/PN10	8	17.42	1.09	213.16	212.47	0.69	202	182	30.47	10.47
85	68	85	110	20.82	PEAD/PN10	8	17.42	1.09	212.25	211.89	0.36	204	184	27.89	7.89
85	69	86	110	41.58	PEAD/PN10	8	17.42	1.09	211.69	210.97	0.72	196	176	34.97	14.97
85	70	87	110	47.1	PEAD/PN10	8	17.42	1.09	210.2	209.38	0.82	204.2	184.2	25.18	5.18
85	71	88	110	112.93	PEAD/PN10	8	17.42	1.09	208.76	206.79	1.97	194.2	174.2	32.59	12.59
85	72	89	110	111.75	PEAD/PN10	8	17.42	1.09	207.77	205.82	1.95	193.5	173.5	32.32	12.32
85	73	90	125	82.5	PEAD/PN10	16	34.67	1.68	206.93	204.07	2.86	---	---	---	---
85	90	91	110	36.21	PEAD/PN10	8	17.42	1.09	204.07	203.44	0.63	196.8	176.8	26.64	6.64
85	90	92	110	170.12	PEAD/PN10	8	17.42	1.09	204.07	201.11	2.96	190.5	170.5	30.61	10.61
85	74	93	110	19.66	PEAD/PN10	8	17.42	1.09	204.95	204.6	0.34	198	178	26.6	6.6
85	75	94	125	30.15	PEAD/PN10	16	34.67	1.68	202.9	201.86	1.05	---	---	---	---
85	94	95	110	18.15	PEAD/PN10	8	17.42	1.09	201.86	201.54	0.32	195.5	175.5	26.04	6.04
85	94	96	110	117.85	PEAD/PN10	8	17.42	1.09	201.86	199.81	2.05	194.7	169.7	30.11	5.11
85	76	97	110	27.74	PEAD/PN10	8	17.42	1.09	201.99	201.51	0.48	193.5	173.5	28.01	8.01
85	77	98	160	62.73	PEAD/PN10	24	20.81	1.54	198.55	197.24	1.31	---	---	---	---
85	98	99	160	86.38	PEAD/PN10	24	20.81	1.54	197.24	195.44	1.8	---	---	---	---
85	99	100	160	54.24	PEAD/PN10	24	20.81	1.54	195.44	194.32	1.13	---	---	---	---
85	100	101	160	42.66	PEAD/PN10	24	20.81	1.54	194.32	193.43	0.89	---	---	---	---
85	101	102	160	41.68	PEAD/PN10	24	20.81	1.54	193.43	192.56	0.87	---	---	---	---
85	102	103	160	27.12	PEAD/PN10	24	20.81	1.54	192.56	192	0.56	---	---	---	---
85	103	104	160	23.94	PEAD/PN10	24	20.81	1.54	192	191.5	0.5	---	---	---	---
85	104	105	125	93.18	PEAD/PN10	16	34.67	1.68	191.5	188.27	3.23	---	---	---	---
85	105	106	110	77.51	PEAD/PN10	8	17.42	1.09	188.27	186.92	1.35	184	159	27.92	2.92
85	105	107	110	68.4	PEAD/PN10	8	17.42	1.09	188.27	187.08	1.19	183.2	158.2	28.88	3.88
85	98	108	110	31.7	PEAD/PN10	8	17.42	1.09	197.24	196.69	0.55	188.6	163.6	33.09	8.09
85	99	109	110	32.8	PEAD/PN10	8	17.42	1.09	195.44	194.87	0.57	187.8	162.8	32.07	7.07
85	99	110	110	109.3	PEAD/PN10	8	17.42	1.09	195.44	193.54	1.9	188	163	30.54	5.54
85	101	111	110	96.2	PEAD/PN10	8	17.42	1.09	193.43	191.75	1.68	184.5	159.5	32.25	7.25
85	102	112	125	8.2	PEAD/PN10	16	34.67	1.68	192.56	192.28	0.28	---	---	---	---
85	112	113	110	24.1	PEAD/PN10	8	17.42	1.09	192.28	191.86	0.42	188.1	163.1	28.76	3.76
85	112	114	110	125.7	PEAD/PN10	8	17.42	1.09	192.28	190.09	2.19	183.1	158.1	31.99	6.99
85	103	115	110	46.2	PEAD/PN10	8	17.42	1.09	192	191.19	0.8	188.7	163.7	27.49	2.49
85	104	116	110	183.9	PEAD/PN10	8	17.42	1.09	191.5	188.3	3.2	188.3	163.3	25	0
85	78	117	110	19.8	PEAD/PN10	8	17.42	1.09	196.81	196.46	0.34	188	163	33.46	8.46
85	80	118	110	19.2	PEAD/PN10	8	17.42	1.09	194.68	194.34	0.33	186.6	161.6	32.74	7.74
85	81	119	110	55.5	PEAD/PN10	8	17.42	1.09	192.67	191.7	0.97	185.6	160.6	31.1	6.1
85	79	120	110	189.1	PEAD/PN10	8	17.42	1.09	194.78	191.49	3.29	182.9	157.9	33.59	8.59
83	3	121	200	2.0	PEAD/PN10	24	5.55	0.98	217.32	217.32	0.01	---	---	---	---
83	121	122	160	57.1	PEAD/PN10	24	20.81	1.54	217.32	216.13	1.19	---	---	---	---
83	122	123	160	41.4	PEAD/PN10	24	20.81	1.54	216.13	215.27	0.86	---	---	---	---
83	123	124	160	41.4	PEAD/PN10	24	20.81	1.54	215.27	214.41	0.86	---	---	---	---
83	124	125	160	39.4	PEAD/PN10	24	20.81	1.54	214.41	213.59	0.82	---	---	---	---
83	125	126	160	78.1	PEAD/PN10	24	20.81	1.54	213.59	211.96	1.63	---	---	---	---
83	126	127	160	72.4	PEAD/PN10	24	20.81	1.54	211.96	210.45	1.51	---	---	---	---
83	127	128	160	65.2	PEAD/PN10	24	20.81	1.54	210.45	209.1	1.36	---	---	---	---
83	128	129	160	85.7	PEAD/PN10	24	20.81	1.54	209.1	207.32	1.78	---	---	---	---
83	129	130	125	21.4	PEAD/PN10	16	34.67	1.68	207.32	206.57	0.74	---	---	---	---
83	130	131	110	108.9	PEAD/PN10	8	17.42	1.09	206.57	204.68	1.9	195	175	29.68	9.68
83	123	132	110	33.7	PEAD/PN10	8	17.42	1.09	215.27	214.68	0.59	208	188	26.68	6.68
83	124	133	110	57.3	PEAD/PN10	8	17.42	1.09	214.41	213.41	1	203.8	183.8	29.61	9.61
83	125	134	110	59.7	PEAD/PN10	8	17.42	1.09	213.59	212.55	1.04	202.8	182.8	29.75	9.75
83	126	135	125	24.0	PEAD/PN10	8	8.67	0.84	211.96	---	0.21	---	---	---	---
83	126	135	110	26.2	PEAD/PN10	8	17.42	1.09	211.75	211.3	0.46	211.3	191.3	20	---

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83	128	136	125	43.0	PEAD/PN10	8	8.64	0.84	209.1		0.37				
83	128	136	110	70.3	PEAD/PN10	8	17.45	1.09	208.73	207.5	1.23	207.5	187.5	20	
83	128	137	110	57.1	PEAD/PN10	8	17.42	1.09	209.1	208.1	0.99	203.5	183.5	24.6	4.6
83	129	138	110	61.7	PEAD/PN10	8	17.42	1.09	207.32	206.24	1.08	201	181	25.24	5.24
83	121	139	200	13.4	PEAD/PN10	24	5.55	0.98	217.32	217.24	0.07	---	---	---	---
83	139	140	160	5.4	PEAD/PN10	24	20.81	1.54	217.24	217.13	0.11	---	---	---	---
83	140	141	160	77.5	PEAD/PN10	24	20.81	1.54	217.13	215.52	1.61	---	---	---	---
83	141	142	160	66.6	PEAD/PN10	24	20.81	1.54	215.52	214.13	1.39	---	---	---	---
83	142	143	125	79.3	PEAD/PN10	16	34.67	1.68	214.13	211.38	2.75	---	---	---	---
83	143	144	110	77.5	PEAD/PN10	8	17.42	1.09	211.38	210.03	1.35	204	184	26.03	6.03
83	139	145	200	71.1	PEAD/PN10	24	5.55	0.98	217.24	216.85	0.39	---	---	---	---
83	145	146	125	14.0	PEAD/PN10	8	8.6	0.84	216.85		0.12				
83	145	146	110	12.9	PEAD/PN10	8	17.56	1.09	216.73	216.5	0.23	216.5	196.5	20	
83	145	147	200	79.2	PEAD/PN10	24	5.55	0.98	216.85	216.41	0.44	---	---	---	---
83	147	148	200	51.4	PEAD/PN10	24	5.55	0.98	216.41	216.12	0.29	---	---	---	---
83	148	149	200	23.0	PEAD/PN10	24	5.55	0.98	216.12		0.13				
83	148	149	160	95.8	PEAD/PN10	24	20.81	1.54	215.99	214	1.99	---	---	---	---
83	149	150	160	60.0	PEAD/PN10	24	20.81	1.54	214	212.75	1.25	---	---	---	---
83	150	151	160	72.2	PEAD/PN10	24	20.81	1.54	212.75	211.25	1.5	---	---	---	---
83	151	152	160	29.8	PEAD/PN10	24	20.81	1.54	211.25	210.63	0.62	---	---	---	---
83	152	153	160	48.7	PEAD/PN10	24	20.81	1.54	210.63	209.62	1.01	---	---	---	---
83	153	154	160	54.7	PEAD/PN10	24	20.81	1.54	209.62	208.48	1.14	---	---	---	---
83	154	155	160	161.5	PEAD/PN10	24	20.81	1.54	208.48	205.12	3.36	---	---	---	---
83	155	156	110	104.4	PEAD/PN10	8	17.42	1.09	205.12	203.3	1.82	196	176	27.3	7.3
83	147	157	110	54.5	PEAD/PN10	8	17.42	1.09	216.41	215.46	0.95	212.5	192.5	22.96	2.96
83	148	158	110	63.8	PEAD/PN10	8	17.42	1.09	216.12	215.01	1.11	209.5	189.5	25.51	5.51
83	149	159	110	51.4	PEAD/PN10	8	17.42	1.09	214	213.11	0.89	212.7	192.7	20.41	0.41
83	150	160	125	87.4	PEAD/PN10	8	8.67	0.84	212.75	212	0.76	212	192	20	0
83	151	161	110	33.8	PEAD/PN10	8	17.42	1.09	211.25	210.66	0.59	205.8	185.8	24.86	4.86
83	154	162	110	32.1	PEAD/PN10	8	17.42	1.09	208.48	207.92	0.56	200.8	180.8	27.12	7.12
83	154	163	110	84.5	PEAD/PN10	8	17.42	1.09	208.48	207.01	1.47	203.3	183.3	23.71	3.71
83	155	164	110	89.5	PEAD/PN10	8	17.42	1.09	205.12	203.56	1.56	195.5	175.5	28.06	8.06
83	155	165	110	39.1	PEAD/PN10	8	17.42	1.09	205.12	204.44	0.68	194.5	174.5	29.94	9.94
82bis	5	166	200	2.0	PEAD/PN10	24	5.55	0.98	215.7	215.69	0.01	---	---	---	---
82bis	166	167	160	55.3	PEAD/PN10	24	20.81	1.54	215.69	214.54	1.15	---	---	---	---
82bis	167	168	160	54.6	PEAD/PN10	24	20.81	1.54	214.54	213.4	1.14	---	---	---	---
82bis	168	169	160	45.6	PEAD/PN10	24	20.81	1.54	213.4	212.46	0.95	---	---	---	---
82bis	169	170	160	85.4	PEAD/PN10	24	20.81	1.54	212.46	210.68	1.78	---	---	---	---
82bis	170	171	160	66.2	PEAD/PN10	24	20.81	1.54	210.68	209.3	1.38	---	---	---	---
82bis	171	172	160	75.9	PEAD/PN10	24	20.81	1.54	209.3	207.72	1.58	---	---	---	---
82bis	172	173	160	23.3	PEAD/PN10	24	20.81	1.54	207.72	207.24	0.48	---	---	---	---
82bis	173	174	160	45.5	PEAD/PN10	24	20.81	1.54	207.24	206.29	0.95	---	---	---	---
82bis	174	175	160	86.0	PEAD/PN10	24	20.81	1.54	206.29	204.5	1.79	---	---	---	---
82bis	175	176	160	120.0	PEAD/PN10	24	20.81	1.54	204.5	202.01	2.5	---	---	---	---
82bis	176	177	160	45.0	PEAD/PN10	24	20.81	1.54	202.01	201.07	0.94	---	---	---	---
82bis	177	178	160	105.2	PEAD/PN10	24	20.81	1.54	201.07	198.88	2.19	---	---	---	---
82bis	178	179	160	33.9	PEAD/PN10	24	20.81	1.54	198.88	198.17	0.71	---	---	---	---
82bis	179	180	160	56.6	PEAD/PN10	24	20.81	1.54	198.17	197	1.18	---	---	---	---
82bis	180	181	160	19.8	PEAD/PN10	24	20.81	1.54	197	196.59	0.41	---	---	---	---
82bis	181	182	160	75.8	PEAD/PN10	24	20.81	1.54	196.59	195.01	1.58	---	---	---	---
82bis	182	183	160	25.6	PEAD/PN10	24	20.81	1.54	195.01	194.48	0.53	---	---	---	---
82bis	183	184	125	26.6	PEAD/PN10	16	34.67	1.68	194.48	193.55	0.92	---	---	---	---
82bis	184	185	110	169.9	PEAD/PN10	8	17.42	1.09	193.55	190.59	2.96	174.5	149.5	41.09	16.09
82bis	166	186	110	28.1	PEAD/PN10	8	17.42	1.09	215.69	215.2	0.49	193.5	173.5	41.7	21.7
82bis	167	187	110	51.2	PEAD/PN10	8	17.42	1.09	214.54	213.65	0.89	195.5	175.5	38.15	18.15
82bis	168	188	110	61.1	PEAD/PN10	8	17.42	1.09	213.4	212.34	1.06	195	175	37.34	17.34
82bis	170	189	110	56.7	PEAD/PN10	8	17.42	1.09	210.68	209.69	0.99	198.5	178.5	31.19	11.19
82bis	171	190	110	35.9	PEAD/PN10	8	17.42	1.09	209.3	208.68	0.63	196	176	32.68	12.68
82bis	173	191	160	61.7	PEAD/PN10	24	20.81	1.54	207.24	205.96	1.28	---	---	---	---
82bis	191	192	160	80.7	PEAD/PN10	24	20.81	1.54	205.96	204.28	1.68	---	---	---	---
82bis	192	193	160	22.3	PEAD/PN10	24	20.81	1.54	204.28	203.81	0.46	---	---	---	---
82bis	193	194	160	54.3	PEAD/PN10	24	20.81	1.54	203.81	202.68	1.13	---	---	---	---
82bis	194	195	160	37.9	PEAD/PN10	24	20.81	1.54	202.68	201.89	0.79	---	---	---	---
82bis	195	196	160	75.4	PEAD/PN10	24	20.81	1.54	201.89	200.33	1.57	---	---	---	---
82bis	196	197	160	67.9	PEAD/PN10	24	20.81	1.54	200.33	198.91	1.41	---	---	---	---
82bis	197	198	160	64.3	PEAD/PN10	24	20.81	1.54	198.91	197.58	1.34	---	---	---	---
82bis	198	199	125	31.2	PEAD/PN10	16	34.67	1.68	197.58	196.49	1.08	---	---	---	---
82bis	199	200	110	214.3	PEAD/PN10	8	17.42	1.09	196.49	192.76	3.73	182	157	35.76	10.76
82bis	191	201	110	21.1	PEAD/PN10	8	17.42	1.09	205.96	205.59	0.37	195.5	175.5	30.09	10.09
82bis	192	202	110	87.5	PEAD/PN10	8	17.42	1.09	204.28	202.75	1.52	192.5	167.5	35.25	10.25
82bis	193	203	110	57.7	PEAD/PN10	8	17.42	1.09	203.81	202.81	1	190	170	32.81	12.81
82bis	194	204	110	78.2	PEAD/PN10	8	17.42	1.09	202.68	201.32	1.36	193.2	168.2	33.12	8.12
82bis	195	205	110	28.4	PEAD/PN10	8	17.42	1.09	201.89	201.4	0.49	194.2	174.2	27.2	7.2
82bis	196	206	110	14.7	PEAD/PN10	8	17.42	1.09	200.33	200.07	0.26	190	170	30.07	10.07
82bis	197	207	110	81.3	PEAD/PN10	8	17.42	1.09	198.91	197.5	1.42	190	165	32.5	7.5

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82bis	198	208	110	34.9	PEAD/PN10	8	17.42	1.09	197.58	196.97	0.61	191.5	166.5	30.47	5.47
82bis	199	209	110	28.1	PEAD/PN10	8	17.42	1.09	196.49	196	0.49	187.5	162.5	33.5	8.5
82bis	174	210	110	27.3	PEAD/PN10	8	17.42	1.09	206.29	205.82	0.48	193.5	168.5	37.32	12.32
82bis	175	211	110	39.4	PEAD/PN10	8	17.42	1.09	204.5	203.81	0.69	190.5	165.5	38.31	13.31
82bis	176	212	110	26.5	PEAD/PN10	8	17.42	1.09	202.01	201.54	0.46	188.5	163.5	38.04	13.04
82bis	177	213	110	65.5	PEAD/PN10	8	17.42	1.09	201.07	199.93	1.14	186	161	38.93	13.93
82bis	178	214	110	39.3	PEAD/PN10	8	17.42	1.09	198.88	198.2	0.68	191.8	166.8	31.4	6.4
82bis	179	215	110	67.7	PEAD/PN10	8	17.42	1.09	198.17	197	1.18	189	164	33	8
82bis	181	216	110	54.9	PEAD/PN10	8	17.42	1.09	196.59	195.63	0.96	187.8	162.8	32.83	7.83
82bis	182	217	110	27.2	PEAD/PN10	8	17.42	1.09	195.01	194.54	0.47	187.9	162.9	31.64	6.64
82bis	183	218	110	45.3	PEAD/PN10	8	17.42	1.09	194.48	193.69	0.79	185	160	33.69	8.69
82bis	184	219	110	78.7	PEAD/PN10	8	17.42	1.09	193.55	192.18	1.37	177.8	152.8	39.38	14.38
82bis	166	220	160	63.0	PEAD/PN10	24	20.81	1.54	215.69	214.38	1.31	---	---	---	---
82bis	220	221	160	61.1	PEAD/PN10	24	20.81	1.54	214.38	213.11	1.27	---	---	---	---
82bis	221	222	160	98.3	PEAD/PN10	24	20.81	1.54	213.11	211.06	2.04	---	---	---	---
82bis	222	223	160	54.2	PEAD/PN10	24	20.81	1.54	211.06	209.94	1.13	---	---	---	---
82bis	223	224	160	51.8	PEAD/PN10	24	20.81	1.54	209.94	208.86	1.08	---	---	---	---
82bis	224	225	160	43.3	PEAD/PN10	24	20.81	1.54	208.86	207.96	0.9	---	---	---	---
82bis	225	226	160	7.9	PEAD/PN10	24	20.81	1.54	207.96	207.79	0.17	---	---	---	---
82bis	226	227	160	61.2	PEAD/PN10	24	20.81	1.54	207.79	206.52	1.27	---	---	---	---
82bis	227	228	160	19.4	PEAD/PN10	24	20.81	1.54	206.52	206.12	0.4	---	---	---	---
82bis	228	229	160	40.9	PEAD/PN10	24	20.81	1.54	206.12	205.27	0.85	---	---	---	---
82bis	229	230	160	34.3	PEAD/PN10	24	20.81	1.54	205.27	204.55	0.71	---	---	---	---
82bis	230	231	125	60.7	PEAD/PN10	16	34.67	1.68	204.55	202.45	2.1	---	---	---	---
82bis	231	232	110	97.3	PEAD/PN10	8	17.42	1.09	202.45	200.75	1.69	180.2	155.2	45.55	20.55
82bis	221	233	110	28.3	PEAD/PN10	8	17.42	1.09	213.11	212.62	0.49	194.5	174.5	38.12	18.12
82bis	222	234	110	74.8	PEAD/PN10	8	17.42	1.09	211.06	209.76	1.3	193	168	41.76	16.76
82bis	223	235	110	119.8	PEAD/PN10	8	17.42	1.09	209.94	207.85	2.09	194	169	38.85	13.85
82bis	224	236	110	75.3	PEAD/PN10	8	17.42	1.09	208.86	207.55	1.31	191.5	166.5	41.05	16.05
82bis	225	237	110	44.5	PEAD/PN10	8	17.42	1.09	207.96	207.18	0.77	192.5	167.5	39.68	14.68
82bis	226	238	110	104.6	PEAD/PN10	8	17.42	1.09	207.79	205.97	1.82	190	165	40.97	15.97
82bis	227	239	110	88.9	PEAD/PN10	8	17.42	1.09	206.52	204.97	1.55	187.9	162.9	42.07	17.07
82bis	228	240	110	83.6	PEAD/PN10	8	17.42	1.09	206.12	204.66	1.46	187	162	42.66	17.66
82bis	229	241	110	82.0	PEAD/PN10	8	17.42	1.09	205.27	203.84	1.43	186	161	42.84	17.84
82bis	230	242	110	90.1	PEAD/PN10	8	17.42	1.09	204.55	202.98	1.57	184	159	43.98	18.98
82bis	231	243	110	89.7	PEAD/PN10	8	17.42	1.09	202.45	200.89	1.56	186.8	161.8	39.09	14.09
81	10	244	250	2.0	PEAD/PN10	24	1.68	0.62	214.68	214.68	0	---	---	---	---
81	244	245	250	58.1	PEAD/PN10	24	1.68	0.62	214.68	214.58	0.1	---	---	---	---
81	245	246	250	46.2	PEAD/PN10	24	1.68	0.62	214.58	214.5	0.08	---	---	---	---
81	246	247	250	64.6	PEAD/PN10	24	1.68	0.62	214.5	214.39	0.11	---	---	---	---
81	247	248	250	97.3	PEAD/PN10	24	1.68	0.62	214.39	214.23	0.16	---	---	---	---
81	248	249	250	53.8	PEAD/PN10	24	1.68	0.62	214.23	214.14	0.09	---	---	---	---
81	249	250	250	138.1	PEAD/PN10	24	1.68	0.62	214.14	213.91	0.23	---	---	---	---
81	250	251	250	56.3	PEAD/PN10	24	1.68	0.62	213.91	213.81	0.09	---	---	---	---
81	251	252	250	123.2	PEAD/PN10	24	1.68	0.62	213.81	213.61	0.21	---	---	---	---
81	252	253	200	121.7	PEAD/PN10	16	2.47	0.66	213.61	213.31	0.3	---	---	---	---
81	253	254	160	47.1	PEAD/PN10	8	2.31	0.51	213.31	213.2	0.11	213.2	193.2	20	0
81	247	255	110	48.2	PEAD/PN10	8	17.42	1.09	214.39	213.55	0.84	192	172	41.55	21.55
81	248	256	110	27.6	PEAD/PN10	8	17.42	1.09	214.23	213.75	0.48	198	178	35.75	15.75
81	249	257	110	34.0	PEAD/PN10	8	17.42	1.09	214.14	213.55	0.59	200.5	180.5	33.05	13.05
81	250	258	110	83.2	PEAD/PN10	8	17.42	1.09	213.91	212.46	1.45	208.8	188.8	23.66	3.66
81	251	259	110	67.3	PEAD/PN10	8	17.42	1.09	213.81	212.64	1.17	209.5	189.5	23.14	3.14
81	252	260	110	28.8	PEAD/PN10	8	17.42	1.09	213.61	213.11	0.5	212.5	192.5	20.61	0.61
81	253	261	110	56.5	PEAD/PN10	8	17.42	1.09	213.31	212.33	0.98	211.7	191.7	20.63	0.63
81	246	262	200	20.3	PEAD/PN10	24	5.55	0.98	214.5	214.39	0.11	---	---	---	---
81	262	263	160	50.0	PEAD/PN10	24	20.81	1.54	214.39	213.35	1.04	---	---	---	---
81	263	264	160	69.1	PEAD/PN10	24	20.81	1.54	213.35	211.91	1.44	---	---	---	---
81	264	265	160	89.0	PEAD/PN10	24	20.81	1.54	211.91	210.06	1.85	---	---	---	---
81	265	266	125	89.0	PEAD/PN10	16	34.67	1.68	210.06	206.98	3.09	---	---	---	---
81	266	267	110	139.3	PEAD/PN10	8	17.42	1.09	206.98	204.55	2.43	193.2	168.2	36.35	11.35
81	263	268	110	22.3	PEAD/PN10	8	17.42	1.09	213.35	212.96	0.39	196.8	176.8	36.16	16.16
81	264	269	110	58.1	PEAD/PN10	8	17.42	1.09	211.91	210.9	1.01	193	173	37.9	17.9
81	265	270	110	59.4	PEAD/PN10	8	17.42	1.09	210.06	209.03	1.03	191.8	171.8	37.23	17.23
81	266	271	110	55.9	PEAD/PN10	8	17.42	1.09	206.98	206	0.97	190.2	170.2	35.8	15.8
81	262	272	200	39.5	PEAD/PN10	24	5.55	0.98	214.39	214.17	0.22	---	---	---	---
81	272	273	110	12.6	PEAD/PN10	8	17.42	1.09	214.17	213.95	0.22	198.1	178.1	35.85	15.85
81	272	274	200	49.4	PEAD/PN10	24	5.55	0.98	214.17	213.9	0.27	---	---	---	---
81	274	275	160	42.6	PEAD/PN10	24	20.81	1.54	213.9	213.01	0.89	---	---	---	---
81	275	276	160	120.3	PEAD/PN10	24	20.81	1.54	213.01	210.51	2.5	---	---	---	---
81	276	277	160	43.5	PEAD/PN10	24	20.81	1.54	210.51	209.6	0.91	---	---	---	---
81	277	278	160	71.4	PEAD/PN10	24	20.81	1.54	209.6	208.12	1.49	---	---	---	---
81	278	279	160	124.6	PEAD/PN10	24	20.81	1.54	208.12	205.53	2.59	---	---	---	---
81	279	280	125	69.1	PEAD/PN10	16	34.67	1.68	205.53	203.13	2.4	---	---	---	---
81	280	281	110	75.4	PEAD/PN10	8	17.42	1.09	203.13	201.82	1.31	194.8	169.8	32.02	7.02
81	276	282	110	45.2	PEAD/PN10	8	17.42	1.09	210.51	209.72	0.79	194.2	174.2	35.52	15.52

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81	277	283	110	47.1	PEAD/PN10	8	17.42	1.09	209.6	208.78	0.82	194	174	34.78	14.78
81	278	284	110	19.9	PEAD/PN10	8	17.42	1.09	208.12	207.77	0.35	192.1	172.1	35.67	15.67
81	279	285	110	62.5	PEAD/PN10	8	17.42	1.09	205.53	204.44	1.09	194.4	169.4	35.04	10.04
81	280	286	110	17.6	PEAD/PN10	8	17.42	1.09	203.13	202.82	0.31	190.5	170.5	32.32	12.32
81	274	287	200	20.7	PEAD/PN10	24	5.55	0.98	213.9	213.78	0.11	---	---	---	---
81	287	288	200	18.0	PEAD/PN10	24	5.55	0.98	213.78	---	0.1	---	---	---	---
81	287	288	160	46.4	PEAD/PN10	24	20.81	1.54	213.68	212.72	0.96	---	---	---	---
81	288	289	200	49.5	PEAD/PN10	24	5.55	0.98	212.72	212.44	0.27	---	---	---	---
81	289	290	160	40.5	PEAD/PN10	24	20.81	1.54	212.44	211.6	0.84	---	---	---	---
81	290	291	160	28.3	PEAD/PN10	24	20.81	1.54	211.6	211.01	0.59	---	---	---	---
81	291	292	160	70.8	PEAD/PN10	24	20.81	1.54	211.01	209.54	1.47	---	---	---	---
81	292	293	160	15.1	PEAD/PN10	16	9.25	1.02	209.54	209.4	0.14	---	---	---	---
81	293	294	125	46.2	PEAD/PN10	8	8.67	0.84	209.4	209	0.4	209	189	20	0
81	288	295	110	22.4	PEAD/PN10	8	17.42	1.09	212.72	212.33	0.39	204.2	184.2	28.13	8.13
81	289	296	110	56.5	PEAD/PN10	8	17.42	1.09	212.44	211.46	0.98	203.2	183.2	28.26	8.26
81	290	297	110	41.3	PEAD/PN10	8	17.42	1.09	211.6	210.88	0.72	204.8	184.8	26.08	6.08
81	291	298	110	57.9	PEAD/PN10	8	17.42	1.09	211.01	210	1.01	204	184	26	6
81	292	299	125	17.0	PEAD/PN10	8	8.67	0.84	209.54	---	0.15	---	---	---	---
81	292	299	110	11.1	PEAD/PN10	8	17.42	1.09	209.39	209.2	0.19	209.2	189.2	20	---
81	293	300	110	59.8	PEAD/PN10	8	17.42	1.09	209.4	208.36	1.04	206.2	186.2	22.16	2.16
81	287	301	160	38.9	PEAD/PN10	24	20.81	1.54	213.78	212.97	0.81	---	---	---	---
81	301	302	160	56.0	PEAD/PN10	24	20.81	1.54	212.97	211.81	1.17	---	---	---	---
81	302	303	160	112.7	PEAD/PN10	24	20.81	1.54	211.81	209.46	2.35	---	---	---	---
81	303	304	160	53.2	PEAD/PN10	24	20.81	1.54	209.46	208.36	1.11	---	---	---	---
81	304	305	160	62.5	PEAD/PN10	24	20.81	1.54	208.36	207.06	1.3	---	---	---	---
81	305	306	125	145.0	PEAD/PN10	16	34.67	1.68	207.06	202.03	5.03	---	---	---	---
81	306	307	110	77.4	PEAD/PN10	8	17.42	1.09	202.03	200.68	1.35	191	171	29.68	9.68
81	301	308	110	54.5	PEAD/PN10	8	17.42	1.09	212.97	212.02	0.95	198.6	178.6	33.42	13.42
81	302	309	110	30.5	PEAD/PN10	8	17.42	1.09	211.81	211.28	0.53	198.8	178.8	32.48	12.48
81	303	310	110	24.9	PEAD/PN10	8	17.42	1.09	209.46	209.03	0.43	197	177	32.03	12.03
81	304	311	110	21.6	PEAD/PN10	8	17.42	1.09	208.36	207.98	0.38	196.5	176.5	31.48	11.48
81	305	312	110	42.5	PEAD/PN10	8	17.42	1.09	207.06	206.32	0.74	195.8	175.8	30.52	10.52
82	7	313	200	2.0	PEAD/PN10	32	9.86	1.31	209.85	209.83	0.02	---	---	---	---
82	313	314	200	52.6	PEAD/PN10	32	9.86	1.31	209.83	209.31	0.52	---	---	---	---
82	314	315	200	92.3	PEAD/PN10	32	9.86	1.31	209.31	208.4	0.91	---	---	---	---
82	315	316	200	69.7	PEAD/PN10	32	9.86	1.31	208.4	207.72	0.69	---	---	---	---
82	316	317	200	334.3	PEAD/PN10	32	9.86	1.31	207.72	204.42	3.3	---	---	---	---
82	317	318	200	58.1	PEAD/PN10	32	9.86	1.31	204.42	203.85	0.57	---	---	---	---
82	318	319	200	91.5	PEAD/PN10	32	9.86	1.31	203.85	202.95	0.9	---	---	---	---
82	319	320	160	72.4	PEAD/PN10	24	20.81	1.54	202.95	201.44	1.51	---	---	---	---
82	320	321	125	44.5	PEAD/PN10	16	34.67	1.68	201.44	199.9	1.54	---	---	---	---
82	321	322	110	72.6	PEAD/PN10	8	17.42	1.09	199.9	198.63	1.26	183.8	158.8	39.83	14.83
82	314	323	110	42.6	PEAD/PN10	8	17.42	1.09	209.31	208.57	0.74	189	164	44.57	19.57
82	317	324	110	16.3	PEAD/PN10	8	17.42	1.09	204.42	204.14	0.28	185.6	160.6	43.54	18.54
82	318	325	110	50.9	PEAD/PN10	8	17.42	1.09	203.85	202.96	0.89	184	159	43.96	18.96
82	319	326	110	59.8	PEAD/PN10	8	17.42	1.09	202.95	201.91	1.04	182.5	157.5	44.41	19.41
82	321	327	110	23.6	PEAD/PN10	8	17.42	1.09	199.9	199.49	0.41	184.8	159.8	39.69	14.69
82	316	328	200	34.9	PEAD/PN10	32	9.86	1.31	207.72	207.37	0.34	---	---	---	---
82	328	329	200	28.8	PEAD/PN10	32	9.86	1.31	207.37	207.09	0.28	---	---	---	---
82	329	330	110	44.3	PEAD/PN10	8	17.42	1.09	207.09	206.32	0.77	189.5	164.5	41.82	16.82
82	329	331	200	35.9	PEAD/PN10	32	9.86	1.31	207.09	206.74	0.35	---	---	---	---
82	331	332	110	23.5	PEAD/PN10	8	17.42	1.09	206.74	206.33	0.41	192.2	167.2	39.13	14.13
82	331	333	200	29.7	PEAD/PN10	32	9.86	1.31	206.74	206.44	0.29	---	---	---	---
82	333	334	200	44.0	PEAD/PN10	32	9.86	1.31	206.44	206.01	0.43	---	---	---	---
82	334	335	160	87.8	PEAD/PN10	24	20.81	1.54	206.01	204.18	1.83	---	---	---	---
82	335	336	125	41.9	PEAD/PN10	16	34.67	1.68	204.18	202.73	1.45	---	---	---	---
82	336	337	110	82.1	PEAD/PN10	8	17.42	1.09	202.73	201.3	1.43	180.5	155.5	45.8	20.8
82	334	338	110	31.5	PEAD/PN10	8	17.42	1.09	206.01	205.46	0.55	192.1	167.1	38.36	13.36
82	335	339	110	48.0	PEAD/PN10	8	17.42	1.09	204.18	203.35	0.84	185.2	160.2	43.15	18.15
82	336	340	110	34.7	PEAD/PN10	8	17.42	1.09	202.73	202.12	0.61	183.4	158.4	43.72	18.72
82	333	341	200	62.0	PEAD/PN10	32	9.86	1.31	206.44	205.83	0.61	---	---	---	---
82	341	342	110	22.6	PEAD/PN10	8	17.42	1.09	205.83	205.44	0.39	189	164	41.44	16.44
82	341	343	200	241.1	PEAD/PN10	32	9.86	1.31	205.83	203.45	2.38	---	---	---	---
82	343	344	160	47.4	PEAD/PN10	24	20.81	1.54	203.45	202.47	0.99	---	---	---	---
82	344	345	125	72.3	PEAD/PN10	16	34.67	1.68	202.47	199.96	2.51	---	---	---	---
82	345	346	110	88.2	PEAD/PN10	8	17.42	1.09	199.96	198.43	1.54	181	156	42.43	17.43
82	344	347	110	39.3	PEAD/PN10	8	17.42	1.09	202.47	201.78	0.68	188	163	38.78	13.78
82	343	348	200	25.6	PEAD/PN10	32	9.86	1.31	203.45	203.2	0.25	---	---	---	---
82	348	349	200	56.2	PEAD/PN10	32	9.86	1.31	203.2	202.65	0.55	---	---	---	---
82	349	350	200	60.6	PEAD/PN10	32	9.86	1.31	202.65	202.05	0.6	---	---	---	---
82	350	351	160	53.6	PEAD/PN10	24	20.81	1.54	202.05	200.93	1.11	---	---	---	---
82	351	352	125	166.7	PEAD/PN10	16	34.67	1.68	200.93	195.16	5.78	---	---	---	---
82	352	353	110	32.6	PEAD/PN10	8	17.42	1.09	195.16	194.59	0.57	194.4	169.4	25.19	0.19
82	350	354	110	41.3	PEAD/PN10	8	17.42	1.09	202.05	201.33	0.72	188	163	38.33	13.33
82	351	355	110	70.4	PEAD/PN10	8	17.42	1.09	200.93	199.71	1.23	179.8	154.8	44.91	19.91

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82	352	356	110	53.3	PEAD/PN10	8	17.42	1.09	195.16	194.23	0.93	192.5	167.5	26.73	1.73
82	348	357	200	122.0	PEAD/PN10	32	9.86	1.31	203.2	202	1.2	---	---	---	---
82	357	358	200	88.0	PEAD/PN10	32	9.86	1.31	202	201.13	0.87	---	---	---	---
82	358	359	200	46.5	PEAD/PN10	32	9.86	1.31	201.13	200.67	0.46	---	---	---	---
82	359	360	200	22.6	PEAD/PN10	32	9.86	1.31	200.67	200.45	0.22	---	---	---	---
82	360	361	160	97.9	PEAD/PN10	24	20.81	1.54	200.45	198.41	2.04	---	---	---	---
82	361	362	125	48.8	PEAD/PN10	16	34.67	1.68	198.41	196.72	1.69	---	---	---	---
82	362	363	110	54.9	PEAD/PN10	8	17.42	1.09	196.72	195.77	0.96	183.4	158.4	37.37	12.37
82	359	364	110	18.3	PEAD/PN10	8	17.42	1.09	200.67	200.35	0.32	189.8	164.8	35.55	10.55
82	360	365	110	33.8	PEAD/PN10	8	17.42	1.09	200.45	199.86	0.59	183.6	158.6	41.26	16.26
82	361	366	110	23.5	PEAD/PN10	8	17.42	1.09	198.41	198	0.41	183.5	158.5	39.5	14.5
82	362	367	110	64.2	PEAD/PN10	8	17.42	1.09	196.72	195.61	1.12	186.1	161.1	34.51	9.51
82	358	368	200	43.2	PEAD/PN10	32	9.86	1.31	201.13	200.7	0.43	---	---	---	---
82	368	369	200	45.2	PEAD/PN10	32	9.86	1.31	200.7	200.26	0.45	---	---	---	---
82	369	370	125	116.0	PEAD/PN10	16	34.67	1.68	200.26	196.24	4.02	---	---	---	---
82	370	371	110	83.3	PEAD/PN10	8	17.42	1.09	196.24	194.79	1.45	187.5	162.5	32.29	7.29
82	370	372	110	39.7	PEAD/PN10	8	17.42	1.09	196.24	195.55	0.69	188	163	32.55	7.55
82	369	373	160	64.7	PEAD/PN10	24	20.81	1.54	200.26	198.91	1.35	---	---	---	---
82	373	374	110	20.1	PEAD/PN10	8	17.42	1.09	198.91	198.56	0.35	191.1	166.1	32.46	7.46
82	373	375	125	152.5	PEAD/PN10	16	34.67	1.68	198.91	193.63	5.29	---	---	---	---
82	375	376	110	47.6	PEAD/PN10	8	17.42	1.09	193.63	192.8	0.83	185.5	160.5	32.3	7.3
82	375	377	110	20.2	PEAD/PN10	8	17.42	1.09	193.63	193.27	0.35	184.5	159.5	33.77	8.77

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“Ammodernamento della rete irrigua dello Jato – I lotto sotto sollevamento” - Progetto Definitivo
Relazione dei calcoli idraulici

Risultati dei calcoli di ottimizzazione della rete di distribuzione a valle della Derivazione F

Consorzio di Bonifica n.2 - Palermo

“Ammodernamento della rete irrigua dello Jato – I lotto sotto sollevamento” - Progetto Definitivo
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COMIZIO	NODO MONTE	NODO VALLE	DIAMETRO (mm)	LUNG. (m)	TIPO TUBAZIONE	PORTATA (l/sec)	PEND. PIEZ. (m/Km)	VEL. (m/sec)	QUOTA MONTE (ms.m.)	QUOTA VALLE (ms.m.)	PERDITA CARICO (m)	QUOTA IMPOSTA (ms.m.)	QUOTA TERRENO (ms.m.)	PRESSIONE (m)	CARICO RESIDUO (m)
RIP-F1	0	1	315	48.38	PEAD/PN10	64	3.62	1.06	216.5	216.32	0.18	---	---	---	---
RIP-F2	1	2	200	42.46	PEAD/PN10	32	9.86	1.31	216.32	215.91	0.42	---	---	---	---
RIP-F1	1	3	200	551.46	PEAD/PN10	32	9.86	1.31	216.32	210.89	5.44	---	---	---	---
86	2	4	200	2	PEAD/PN10	32	9.86	1.31	215.91	215.89	0.02	---	---	---	---
86	4	5	200	52.33	PEAD/PN10	32	9.86	1.31	215.89	215.37	0.52	---	---	---	---
86	5	6	200	26.67	PEAD/PN10	32	9.86	1.31	215.37	215.11	0.26	---	---	---	---
86	6	7	200	100.36	PEAD/PN10	32	9.86	1.31	215.11	214.12	0.99	---	---	---	---
86	7	8	160	125.38	PEAD/PN10	24	20.81	1.54	214.12	211.51	2.61	---	---	---	---
86	8	9	125	144.03	PEAD/PN10	16	34.67	1.68	211.51	206.52	4.99	---	---	---	---
86	9	10	110	167.12	PEAD/PN10	8	17.42	1.09	206.52	203.61	2.91	198.4	178.4	25.21	5.21
86	8	11	110	38.35	PEAD/PN10	8	17.42	1.09	211.51	210.84	0.67	208	188	22.84	2.84
86	9	12	110	77.06	PEAD/PN10	8	17.42	1.09	206.52	205.17	1.34	201	181	24.17	4.17
86	5	13	200	45.16	PEAD/PN10	32	9.86	1.31	215.37	214.93	0.45	---	---	---	---
86	13	14	200	108.24	PEAD/PN10	32	9.86	1.31	214.93	213.86	1.07	---	---	---	---
86	14	15	200	81.84	PEAD/PN10	32	9.86	1.31	213.86	213.05	0.81	---	---	---	---
86	15	16	200	210.08	PEAD/PN10	32	9.86	1.31	213.05	210.98	2.07	---	---	---	---
86	16	17	200	36.56	PEAD/PN10	32	9.86	1.31	210.98	210.62	0.36	---	---	---	---
86	17	18	160	148.14	PEAD/PN10	24	20.81	1.54	210.62	207.54	3.08	---	---	---	---
86	18	19	110	278.45	PEAD/PN10	8	17.42	1.09	207.54	202.69	4.85	190.8	170.8	31.89	11.89
86	13	20	110	69.66	PEAD/PN10	8	17.42	1.09	214.93	213.71	1.21	207.9	187.9	25.81	5.81
86	14	21	110	49.24	PEAD/PN10	8	17.42	1.09	213.86	213	0.86	203.2	183.2	29.8	9.8
86	17	22	110	35.65	PEAD/PN10	8	17.42	1.09	210.62	210	0.62	195	175	35	15
86	18	23	125	65.25	PEAD/PN10	16	34.67	1.68	207.54	205.27	2.26	---	---	---	---
86	23	24	110	65.25	PEAD/PN10	8	17.42	1.09	205.27	204.14	1.14	194.5	169.5	34.64	9.64
86	16	25	200	144.6	PEAD/PN10	32	9.86	1.31	210.98	209.55	1.43	---	---	---	---
86	25	26	200	88.15	PEAD/PN10	32	9.86	1.31	209.55	208.68	0.87	---	---	---	---
86	26	27	200	55.3	PEAD/PN10	32	9.86	1.31	208.68	208.14	0.55	---	---	---	---
86	27	28	200	41	PEAD/PN10	32	9.86	1.31	208.14	207.73	0.4	---	---	---	---
86	28	29	200	56.09	PEAD/PN10	32	9.86	1.31	207.73	207.18	0.55	---	---	---	---
86	29	30	200	66.87	PEAD/PN10	32	9.86	1.31	207.18	206.52	0.66	---	---	---	---
86	30	31	200	35.05	PEAD/PN10	32	9.86	1.31	206.52	206.18	0.35	---	---	---	---
86	31	32	200	71.14	PEAD/PN10	32	9.86	1.31	206.18	205.47	0.7	---	---	---	---
86	32	33	200	97.2	PEAD/PN10	32	9.86	1.31	205.47	204.52	0.96	---	---	---	---
86	33	34	160	42.13	PEAD/PN10	24	20.81	1.54	204.52	203.64	0.88	---	---	---	---
86	34	35	125	29.43	PEAD/PN10	16	34.67	1.68	203.64	202.62	1.02	---	---	---	---
86	35	36	110	57.54	PEAD/PN10	8	17.42	1.09	202.62	201.62	1	194.2	169.2	32.42	7.42
86	25	37	110	53.5	PEAD/PN10	8	17.42	1.09	209.55	208.62	0.93	195	175	33.62	13.62
86	26	38	110	50.21	PEAD/PN10	8	17.42	1.09	208.68	207.81	0.87	193.5	173.5	34.31	14.31
86	27	39	110	55.52	PEAD/PN10	8	17.42	1.09	208.14	207.17	0.97	192	172	35.17	15.17
86	29	40	110	68.68	PEAD/PN10	8	17.42	1.09	207.18	205.98	1.2	194	169	36.98	11.98
86	29	41	110	14.54	PEAD/PN10	8	17.42	1.09	207.18	206.93	0.25	193.4	168.4	38.53	13.53
86	30	42	110	48.71	PEAD/PN10	8	17.42	1.09	206.52	205.67	0.85	189.9	164.9	40.77	15.77
86	31	43	110	65.5	PEAD/PN10	8	17.42	1.09	206.18	205.04	1.14	190.9	165.9	39.14	14.14
86	32	44	110	11.15	PEAD/PN10	8	17.42	1.09	205.47	205.28	0.19	194.2	169.2	36.08	11.08
86	32	45	110	19.85	PEAD/PN10	8	17.42	1.09	205.47	205.13	0.35	194.4	169.4	35.73	10.73
86	33	46	110	43.12	PEAD/PN10	8	17.42	1.09	204.52	203.77	0.75	190	170	33.77	13.77
86	34	47	110	31.85	PEAD/PN10	8	17.42	1.09	203.64	203.08	0.55	193.2	168.2	34.88	9.88
86	35	48	110	27.96	PEAD/PN10	8	17.42	1.09	202.62	202.13	0.49	193.5	168.5	33.63	8.63
86	32	49	200	68.13	PEAD/PN10	32	9.86	1.31	205.47	204.8	0.67	---	---	---	---
86	49	50	125	22.16	PEAD/PN10	16	34.67	1.68	204.8	204.03	0.77	---	---	---	---
86	50	51	110	82.95	PEAD/PN10	8	17.42	1.09	204.03	202.59	1.44	188.8	163.8	38.79	13.79
86	49	52	125	44.52	PEAD/PN10	16	34.67	1.68	204.8	203.26	1.54	---	---	---	---
86	52	53	110	79.19	PEAD/PN10	8	17.42	1.09	203.26	201.88	1.38	187	162	39.88	14.88
86	32	54	200	36.19	PEAD/PN10	32	9.86	1.31	205.47	205.12	0.36	---	---	---	---
86	54	55	200	56.47	PEAD/PN10	32	9.86	1.31	205.12	204.56	0.56	---	---	---	---
86	55	56	200	34.63	PEAD/PN10	32	9.86	1.31	204.56	204.22	0.34	---	---	---	---
86	56	57	200	23.93	PEAD/PN10	32	9.86	1.31	204.22	203.98	0.24	---	---	---	---
86	57	58	200	130.33	PEAD/PN10	32	9.86	1.31	203.98	202.7	1.29	---	---	---	---
86	58	59	200	43.18	PEAD/PN10	32	9.86	1.31	202.7	202.27	0.43	---	---	---	---
86	59	60	160	33.16	PEAD/PN10	24	20.81	1.54	202.27	201.58	0.69	---	---	---	---
86	60	61	125	116.72	PEAD/PN10	16	34.67	1.68	201.58	197.54	4.05	---	---	---	---
86	61	62	110	53.69	PEAD/PN10	8	17.42	1.09	197.54	196.6	0.94	179.2	154.2	42.4	17.4
86	54	63	110	20.36	PEAD/PN10	8	17.42	1.09	205.12	204.76	0.35	191.5	166.5	38.26	13.26
86	55	64	110	53.43	PEAD/PN10	8	17.42	1.09	204.56	203.63	0.93	193	168	35.63	10.63
86	57	65	110	58.94	PEAD/PN10	8	17.42	1.09	203.98	202.96	1.03	188	163	39.96	14.96
86	58	66	110	57.36	PEAD/PN10	8	17.42	1.09	202.7	201.7	1	184.8	159.8	41.9	16.9
86	59	67	110	78.77	PEAD/PN10	8	17.42	1.09	202.27	200.9	1.37	183.2	158.2	42.7	17.7
86	60	68	110	63.34	PEAD/PN10	8	17.42	1.09	201.58	200.48	1.1	182.8	157.8	42.68	17.68
86	61	69	110	50.12	PEAD/PN10	8	17.42	1.09	197.54	196.66	0.87	179.5	154.5	42.16	17.16
86	56	70	200	47.1	PEAD/PN10	32	9.86	1.31	204.22	203.75	0.46	---	---	---	---
86	70	71	110	53.6	PEAD/PN10	8	17.42	1.09	203.75	202.82	0.93	188.5	163.5	39.32	14.32
86	70	72	200	86.37	PEAD/PN10	32	9.86	1.31	203.75	202.9	0.85	---	---	---	---
86	72	73	200	100.86	PEAD/PN10	32	9.86	1.31	202.9	201.91	0.99	---	---	---	---

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86	73	74	160	14.8	PEAD/PN10	24	20.81	1.54	201.91	201.6	0.31	---	---	---	---
86	74	75	125	88.92	PEAD/PN10	16	34.67	1.68	201.6	198.52	3.08	---	---	---	---
86	75	76	110	257.21	PEAD/PN10	8	17.42	1.09	198.52	194.04	4.48	179	154	40.04	15.04
86	72	77	110	50.05	PEAD/PN10	8	17.42	1.09	202.9	202.03	0.87	186.6	161.6	40.43	15.43
86	73	78	110	163.1	PEAD/PN10	8	17.42	1.09	201.91	199.07	2.84	185	160	39.07	14.07
87bis	3	79	200	2	PEAD/PN10	32	9.86	1.31	210.89	210.87	0.02	---	---	---	---
87bis	79	80	200	142.75	PEAD/PN10	32	9.86	1.31	210.87	209.46	1.41	---	---	---	---
87bis	80	81	125	25.7	PEAD/PN10	16	34.67	1.68	209.46	208.57	0.89	---	---	---	---
87bis	81	82	110	23.54	PEAD/PN10	8	17.42	1.09	208.57	208.16	0.41	198.7	178.7	29.46	9.46
87bis	80	83	200	16.54	PEAD/PN10	32	9.86	1.31	209.46	209.3	0.16	---	---	---	---
87bis	83	84	125	152.63	PEAD/PN10	16	34.67	1.68	209.3	204.01	5.29	---	---	---	---
87bis	84	85	110	39.87	PEAD/PN10	8	17.42	1.09	204.01	203.31	0.69	201.6	181.6	21.71	1.71
87bis	84	86	110	59.53	PEAD/PN10	8	17.42	1.09	204.01	202.97	1.04	197.5	177.5	25.47	5.47
87bis	83	87	200	11.39	PEAD/PN10	32	9.86	1.31	209.3	209.18	0.11	---	---	---	---
87bis	87	88	200	21.01	PEAD/PN10	32	9.86	1.31	209.18	208.98	0.21	---	---	---	---
87bis	88	89	110	36.02	PEAD/PN10	8	17.42	1.09	208.98	208.35	0.63	194.5	174.5	33.85	13.85
87bis	88	90	200	8.48	PEAD/PN10	32	9.86	1.31	208.98	208.89	0.08	---	---	---	---
87bis	90	91	110	12.26	PEAD/PN10	8	17.42	1.09	208.89	208.68	0.21	194	174	34.68	14.68
87bis	90	92	200	23.91	PEAD/PN10	32	9.86	1.31	208.89	208.66	0.24	---	---	---	---
87bis	92	93	110	66.98	PEAD/PN10	8	17.42	1.09	208.66	207.49	1.17	192.5	167.5	39.99	14.99
87bis	92	94	200	53.48	PEAD/PN10	32	9.86	1.31	208.66	208.13	0.53	---	---	---	---
87bis	94	95	110	68.86	PEAD/PN10	8	17.42	1.09	208.13	206.93	1.2	191	166	40.93	15.93
87bis	94	96	125	81.17	PEAD/PN10	16	34.67	1.68	208.13	205.32	2.81	---	---	---	---
87bis	96	97	110	109.2	PEAD/PN10	8	17.42	1.09	205.32	203.41	1.9	193	173	30.41	10.41
87bis	94	98	200	54.1	PEAD/PN10	32	9.86	1.31	208.13	207.6	0.53	---	---	---	---
87bis	98	99	110	11.15	PEAD/PN10	8	17.42	1.09	207.6	207.4	0.19	192	167	40.4	15.4
87bis	98	100	200	41.28	PEAD/PN10	32	9.86	1.31	207.6	207.19	0.41	---	---	---	---
87bis	100	101	200	61.34	PEAD/PN10	32	9.86	1.31	207.19	206.58	0.6	---	---	---	---
87bis	101	102	110	61.3	PEAD/PN10	8	17.42	1.09	206.58	205.52	1.07	190	165	40.52	15.52
87bis	101	103	200	40.5	PEAD/PN10	32	9.86	1.31	206.58	206.19	0.4	---	---	---	---
87bis	103	104	110	49.31	PEAD/PN10	8	17.42	1.09	206.19	205.33	0.86	190	165	40.33	15.33
87bis	103	105	200	340.63	PEAD/PN10	32	9.86	1.31	206.19	202.83	3.36	---	---	---	---
87bis	105	106	110	74.48	PEAD/PN10	8	17.42	1.09	202.83	201.53	1.3	179.7	154.7	46.83	21.83
87bis	105	107	200	43.41	PEAD/PN10	32	9.86	1.31	202.83	202.4	0.43	---	---	---	---
87bis	107	108	110	33.81	PEAD/PN10	8	17.42	1.09	202.4	201.81	0.59	184.1	159.1	42.71	17.71
87bis	107	109	200	27.91	PEAD/PN10	32	9.86	1.31	202.4	202.12	0.28	---	---	---	---
87bis	109	110	110	63.08	PEAD/PN10	8	17.42	1.09	202.12	201.02	1.1	180.5	155.5	45.52	20.52
87bis	109	111	200	56.45	PEAD/PN10	32	9.86	1.31	202.12	201.57	0.56	---	---	---	---
87bis	111	112	110	62.39	PEAD/PN10	8	17.42	1.09	201.57	200.48	1.09	183	158	42.48	17.48
87bis	111	113	200	18.75	PEAD/PN10	32	9.86	1.31	201.57	201.38	0.18	---	---	---	---
87bis	113	114	110	17.55	PEAD/PN10	8	17.42	1.09	201.38	201.08	0.31	185.5	160.5	40.58	15.58
87bis	113	115	200	24.85	PEAD/PN10	32	9.86	1.31	201.38	201.14	0.25	---	---	---	---
87bis	115	116	110	62.94	PEAD/PN10	8	17.42	1.09	201.14	200.04	1.1	184.7	159.7	40.34	15.34
87bis	115	117	200	133.29	PEAD/PN10	32	9.86	1.31	201.14	199.82	1.31	---	---	---	---
87bis	117	118	110	51.27	PEAD/PN10	8	17.42	1.09	199.82	198.93	0.89	185	160	38.93	13.93
87bis	117	119	200	69.5	PEAD/PN10	32	9.86	1.31	199.82	199.14	0.69	---	---	---	---
87bis	119	120	200	50.4	PEAD/PN10	32	9.86	1.31	199.14	198.64	0.5	---	---	---	---
87bis	120	121	200	18.7	PEAD/PN10	32	9.86	1.31	198.64	198.45	0.18	---	---	---	---
87bis	121	122	110	47.1	PEAD/PN10	8	17.42	1.09	198.45	197.64	0.82	186	161	36.64	11.64
87bis	121	123	200	63.8	PEAD/PN10	32	9.86	1.31	198.45	197.83	0.63	---	---	---	---
87bis	123	124	160	130.7	PEAD/PN10	24	20.81	1.54	197.83	195.11	2.72	---	---	---	---
87bis	124	125	140	56.0	PEAD/PN10	16	18.75	1.34	195.11		1.05	---	---	---	---
87bis	124	125	125	33.8	PEAD/PN10	16	35.08	1.68	194.06	192.87	1.19	---	---	---	---
87bis	125	126	110	21.2	PEAD/PN10	8	17.42	1.09	192.87	192.5	0.37	192.5	172.5	20	0
87bis	113	127	200	217.6	PEAD/PN10	32	9.86	1.31	201.38	199.24	2.15	---	---	---	---
87bis	127	128	110	11.9	PEAD/PN10	8	17.42	1.09	199.24	199.03	0.21	186.2	161.2	37.83	12.83
87bis	127	129	200	47.5	PEAD/PN10	32	9.86	1.31	199.24	198.77	0.47	---	---	---	---
87bis	129	130	110	77.6	PEAD/PN10	8	17.42	1.09	198.77	197.42	1.35	185	160	37.42	12.42
87bis	129	131	200	149.5	PEAD/PN10	32	9.86	1.31	198.77	197.29	1.47	---	---	---	---
87bis	131	132	200	89.5	PEAD/PN10	32	9.86	1.31	197.29	196.41	0.88	---	---	---	---
87bis	132	133	200	48.0	PEAD/PN10	32	9.86	1.31	196.41	195.94	0.47	---	---	---	---
87bis	133	134	110	110.6	PEAD/PN10	8	17.42	1.09	195.94	194.01	1.93	181	156	38.01	13.01
87bis	133	135	200	21.8	PEAD/PN10	32	9.86	1.31	195.94	195.72	0.22	---	---	---	---
87bis	135	136	110	117.9	PEAD/PN10	8	17.42	1.09	195.72	193.67	2.05	182	157	36.67	11.67
87bis	135	137	200	82.1	PEAD/PN10	32	9.86	1.31	195.72	194.91	0.81	---	---	---	---
87bis	137	138	110	55.0	PEAD/PN10	8	17.42	1.09	194.91	193.96	0.96	190	165	28.96	3.96
87bis	137	139	200	185.8	PEAD/PN10	32	9.86	1.31	194.91	193.08	1.83	---	---	---	---
87bis	139	140	125	69.1	PEAD/PN10	16	34.67	1.68	193.08	190.69	2.4	---	---	---	---
87bis	140	141	110	13.3	PEAD/PN10	8	17.42	1.09	190.69	190.46	0.23	185	160	30.46	5.46
87bis	139	142	200	143.7	PEAD/PN10	32	9.86	1.31	193.08	191.66	1.42	---	---	---	---
87bis	142	143	110	56.7	PEAD/PN10	8	17.42	1.09	191.66	190.68	0.99	184	159	31.68	6.68
87bis	142	144	200	34.1	PEAD/PN10	32	9.86	1.31	191.66	191.33	0.34	---	---	---	---
87bis	144	145	125	80.7	PEAD/PN10	16	34.67	1.68	191.33	188.53	2.8	---	---	---	---
87bis	145	146	110	116.3	PEAD/PN10	8	17.42	1.09	188.53	186.51	2.03	179.1	154.1	32.41	7.41
87bis	144	147	140	52.0	PEAD/PN10	16	18.8	1.34	191.33		0.98	---	---	---	---
87bis	144	147	125	150.4	PEAD/PN10	16	34.72	1.68	190.35	185.13	5.22	---	---	---	---
87bis	147	148	110	55.1	PEAD/PN10	8	17.42	1.09	185.13	184.17	0.96	180.8	155.8	28.37	3.37
87bis	147	149	110	93.5	PEAD/PN10	8	17.42	1.09	185.13	183.5	1.63	183.5	158.5	25	0
87bis	81	150	110	16.5	PEAD/PN10	8	17.42	1.09	208.57	208.28	0.29	197.5	177.5	30.78	10.78

Consorzio di Bonifica n.2 - Palermo

“Ammodernamento della rete irrigua dello Jato – I lotto sotto sollevamento” - Progetto Definitivo
Relazione dei calcoli idraulici

Risultati dei calcoli di ottimizzazione della rete di distribuzione a valle della Derivazione G

Consorzio di Bonifica n.2 - Palermo

"Ammodernamento della rete irrigua dello Jato – I lotto sotto sollevamento" - Progetto Definitivo
Relazione dei calcoli idraulici

COMIZIO	NODO MONTE	NODO VALLE	DIAMETRO	LUNG.	TIPO TUBAZIONE	PORTATA	PEND. PIEZ.	VEL.	QUOTA MONTE	QUOTA VALLE	PERDITA CARICO	QUOTA IMPOSTA	QUOTA TERRENO	PRESSIONE	CARICO RESIDUO
			(mm)	(m)		(l/sec)	(m/Km)	(m/sec)	(ms.m.)	(ms.m.)	(m)	(ms.m.)	(ms.m.)	(m)	(m)
RIP-G1	0	1	250	26.44	PEAD/PN10	48	6.7	1.25	209.78	209.6	0.18	---	---	---	---
RIP-G1	1	2	250	377.22	PEAD/PN10	40	4.66	1.04	209.6	207.85	1.76	---	---	---	---
RIP-G1	2	3	250	538	PEAD/PN10	40	4.65	1.04	207.85		2.5				
RIP-G1	2	3	200	25.36	PEAD/PN10	40	15.61	1.64	205.34	204.95	0.4	---	---	---	---
RIP-G1	3	4	200	171.31	PEAD/PN10	40	15.41	1.64	204.95	202.31	2.64	---	---	---	---
RIP-G1	4	5	200	40.16	PEAD/PN10	40	15.41	1.64	202.31	201.69	0.62	---	---	---	---
RIP-G1	5	6	200	129.28	PEAD/PN10	24	5.55	0.98	201.69	200.97	0.72	---	---	---	---
90	1	7	160	2	PEAD/PN10	8	2.31	0.51	209.6	209.6	0	---	---	---	---
90	7	8	160	13	PEAD/PN10	8	2.24	0.51	209.6		0.03				
90	7	8	140	79.96	PEAD/PN10	8	4.75	0.67	209.57	209.19	0.38	---	---	---	---
90	8	9	140	40.15	PEAD/PN10	8	4.72	0.67	209.19	209	0.19	209	192	17	0
90	7	10	160	13.94	PEAD/PN10	8	2.31	0.51	209.6	209.57	0.03	---	---	---	---
90	10	11	160	65.05	PEAD/PN10	8	2.31	0.51	209.57	209.42	0.15	---	---	---	---
90	11	12	160	106.03	PEAD/PN10	8	2.31	0.51	209.42	209.17	0.25	---	---	---	---
90	12	13	160	123.55	PEAD/PN10	8	2.31	0.51	209.17	208.88	0.29	---	---	---	---
90	13	14	110	15.42	PEAD/PN10	8	17.42	1.09	208.88	208.62	0.27	208	193.1	15.52	0.62
90	13	15	160	64.27	PEAD/PN10	8	2.31	0.51	208.88	208.74	0.15	---	---	---	---
90	15	16	140	19.34	PEAD/PN10	8	4.72	0.67	208.74	208.64	0.09	---	---	---	---
90	16	17	140	92.14	PEAD/PN10	8	4.72	0.67	208.64	208.21	0.43	---	---	---	---
90	17	18	140	9.46	PEAD/PN10	8	4.72	0.67	208.21	208.17	0.04	---	---	---	---
90	18	19	140	33.93	PEAD/PN10	8	4.72	0.67	208.17	208.01	0.16	208	189.9	18.11	0.01
90	17	20	140	41.66	PEAD/PN10	8	4.72	0.67	208.21	208.01	0.2	208	188.6	19.41	0.01
90	10	21	125	200	PEAD/PN10	8	8.67	0.84	209.57		1.73				
90	10	21	110	48.01	PEAD/PN10	8	17.42	1.09	207.83	207	0.84	207	187	20	
93	5	22	160	2	PEAD/PN10	16	9.25	1.02	201.69	201.67	0.02	---	---	---	---
93	22	23	125	71.72	PEAD/PN10	16	34.67	1.68	201.67	199.18	2.49	---	---	---	---
93	23	24	110	64.56	PEAD/PN10	8	17.42	1.09	199.18	198.06	1.12	196.2	176.2	21.86	1.86
93	22	25	160	12.78	PEAD/PN10	16	9.25	1.02	201.67	201.55	0.12	---	---	---	---
93	25	26	110	32.5	PEAD/PN10	8	17.42	1.09	201.55	200.99	0.57	193.6	168.6	32.39	7.39
93	25	27	160	11	PEAD/PN10	16	9.25	1.02	201.55		0.1				
93	25	27	140	90.18	PEAD/PN10	16	18.88	1.34	201.45	199.75	1.7	---	---	---	---
93	27	28	140	59.96	PEAD/PN10	16	18.88	1.34	199.75	198.62	1.13	---	---	---	---
93	28	29	140	150.77	PEAD/PN10	16	18.88	1.34	198.62	195.77	2.85	---	---	---	---
93	29	30	110	48.99	PEAD/PN10	8	17.42	1.09	195.77	194.92	0.85	189.5	164.5	30.42	5.42
93	29	31	125	49.6	PEAD/PN10	16	34.67	1.68	195.77	194.05	1.72	---	---	---	---
93	31	32	110	8.53	PEAD/PN10	8	17.42	1.09	194.05	193.9	0.15	186	161	32.9	7.9
93	31	33	125	171.13	PEAD/PN10	16	34.67	1.68	194.05	188.12	5.93	---	---	---	---
93	33	34	110	51.45	PEAD/PN10	8	17.42	1.09	188.12	187.22	0.9	184.3	159.3	27.92	2.92
93	33	35	125	57.39	PEAD/PN10	16	34.67	1.68	188.12	186.13	1.99	---	---	---	---
93	35	36	125	62.47	PEAD/PN10	16	34.67	1.68	186.13	183.96	2.17	---	---	---	---
93	36	37	110	29.09	PEAD/PN10	8	17.42	1.09	183.96	183.46	0.51	182	157	26.46	1.46
93	36	38	125	64.65	PEAD/PN10	16	34.67	1.68	183.96	181.72	2.24	---	---	---	---
93	38	39	110	8.12	PEAD/PN10	8	17.42	1.09	181.72	181.58	0.14	181	156	25.58	0.58
93	38	40	110	93.21	PEAD/PN10	8	17.42	1.09	181.72	180.1	1.62	180.1	155.1	25	0
93	27	41	140	74.56	PEAD/PN10	16	18.88	1.34	199.75	198.34	1.41	---	---	---	---
93	41	42	140	109.33	PEAD/PN10	16	18.88	1.34	198.34	196.28	2.06	---	---	---	---
93	42	43	140	139.08	PEAD/PN10	16	18.88	1.34	196.28	193.65	2.63	---	---	---	---
93	43	44	140	58.01	PEAD/PN10	16	18.88	1.34	193.65	192.55	1.1	---	---	---	---
93	44	45	125	111.09	PEAD/PN10	16	34.67	1.68	192.55	188.7	3.85	---	---	---	---
93	45	46	110	103.12	PEAD/PN10	8	17.42	1.09	188.7	186.91	1.8	184.2	159.2	27.71	2.71
93	44	47	140	41.46	PEAD/PN10	16	18.88	1.34	192.55	191.77	0.78	---	---	---	---
93	47	48	110	52.18	PEAD/PN10	8	17.42	1.09	191.77	190.86	0.91	185.2	160.2	30.66	5.66
93	47	49	125	84.01	PEAD/PN10	16	34.67	1.68	191.77	188.86	2.91	---	---	---	---
93	49	50	110	16.41	PEAD/PN10	8	17.42	1.09	188.86	188.57	0.29	184	159	29.57	4.57
93	49	51	125	14.86	PEAD/PN10	16	34.67	1.68	188.86	188.34	0.52	---	---	---	---
93	51	52	110	66.97	PEAD/PN10	8	17.42	1.09	188.34	187.18	1.17	182.5	157.5	29.68	4.68
93	51	53	125	40.74	PEAD/PN10	16	34.67	1.68	188.34	186.93	1.41	---	---	---	---
93	53	54	110	92.9	PEAD/PN10	8	17.42	1.09	186.93	185.31	1.62	179.1	154.1	31.21	6.21
93	53	55	125	139.44	PEAD/PN10	16	34.67	1.68	186.93	182.1	4.83	---	---	---	---
93	55	56	110	66.25	PEAD/PN10	8	17.42	1.09	182.1	180.94	1.15	179.1	154.1	26.84	1.84
93	55	57	110	154.28	PEAD/PN10	8	17.42	1.09	182.1	179.41	2.69	179.4	154.4	25.01	0.01
92bis	6	58	200	2	PEAD/PN10	24	5.55	0.98	200.97	200.96	0.01	---	---	---	---
92bis	58	59	200	20.29	PEAD/PN10	24	5.55	0.98	200.96	200.85	0.11	---	---	---	---
92bis	59	60	200	107.12	PEAD/PN10	24	5.55	0.98	200.85	200.25	0.59	---	---	---	---
92bis	60	61	200	122.76	PEAD/PN10	24	5.55	0.98	200.25	199.57	0.68	---	---	---	---
92bis	61	62	160	64.54	PEAD/PN10	24	20.81	1.54	199.57	198.23	1.34	---	---	---	---
92bis	62	63	160	103.94	PEAD/PN10	24	20.81	1.54	198.23	196.07	2.16	---	---	---	---
92bis	63	64	110	83.33	PEAD/PN10	8	17.42	1.09	196.07	194.62	1.45	191.3	171.3	23.32	3.32
92bis	63	65	140	75	PEAD/PN10	16	18.87	1.34	196.07		1.41				
92bis	63	65	125	134.15	PEAD/PN10	16	34.68	1.68	194.65	190	4.65	190	165	25	
92bis	61	66	200	60.35	PEAD/PN10	24	5.55	0.98	199.57	199.24	0.33	---	---	---	---
92bis	66	67	200	64.77	PEAD/PN10	24	5.55	0.98	199.24	198.88	0.36	---	---	---	---
92bis	67	68	125	16.96	PEAD/PN10	16	34.67	1.68	198.88	198.29	0.59	---	---	---	---

Consorzio di Bonifica n.2 - Palermo

“Ammodernamento della rete irrigua dello Jato – I lotto sotto sollevamento” - Progetto Definitivo

Relazione dei calcoli idraulici

92bis	68	69	110	186.55	PEAD/PN10	8	17.42	1.09	198.29	195.04	3.25	181	156	39.04	14.04
92bis	67	70	200	110.84	PEAD/PN10	24	5.55	0.98	198.88	198.26	0.61	---	---	---	---
92bis	70	71	110	20.57	PEAD/PN10	8	17.42	1.09	198.26	197.91	0.36	185	160	37.91	12.91
92bis	70	72	200	60.27	PEAD/PN10	24	5.55	0.98	198.26	197.93	0.33	---	---	---	---
92bis	72	73	110	171.18	PEAD/PN10	8	17.42	1.09	197.93	194.95	2.98	178.3	153.3	41.65	16.65
92bis	72	74	200	125.39	PEAD/PN10	24	5.55	0.98	197.93	197.23	0.7	---	---	---	---
92bis	74	75	200	78.03	PEAD/PN10	24	5.55	0.98	197.23	196.8	0.43	---	---	---	---
92bis	75	76	200	46.67	PEAD/PN10	24	5.55	0.98	196.8	196.54	0.26	---	---	---	---
92bis	76	77	110	90.88	PEAD/PN10	8	17.42	1.09	196.54	194.96	1.58	177	152	42.96	17.96
92bis	76	78	200	40.65	PEAD/PN10	24	5.55	0.98	196.54	196.32	0.23	---	---	---	---
92bis	78	79	200	86.6	PEAD/PN10	24	5.55	0.98	196.32	195.84	0.48	---	---	---	---
92bis	79	80	200	57.74	PEAD/PN10	24	5.55	0.98	195.84	195.52	0.32	---	---	---	---
92bis	80	81	200	158.61	PEAD/PN10	24	5.55	0.98	195.52	194.64	0.88	---	---	---	---
92bis	81	82	200	96.14	PEAD/PN10	24	5.55	0.98	194.64	194.1	0.53	---	---	---	---
92bis	82	83	160	65.75	PEAD/PN10	16	9.25	1.02	194.1	193.5	0.61	---	---	---	---
92bis	83	84	140	62.59	PEAD/PN10	8	4.72	0.67	193.5	193.2	0.3	193.2	168.2	25	0

Consorzio di Bonifica n.2 - Palermo

“Ammodernamento della rete irrigua dello Jato – I lotto sotto sollevamento” - Progetto Definitivo
Relazione dei calcoli idraulici

Risultati dei calcoli di ottimizzazione della rete di distribuzione a valle della Derivazione H

Consorzio di Bonifica n.2 - Palermo

"Ammodernamento della rete irrigua dello Jato – I lotto sotto sollevamento" - Progetto Definitivo
Relazione dei calcoli idraulici

COMIZIO	NODO MONTE	NODO VALLE	DIAMETRO (mm)	LUNG. (m)	TIPO TUBAZIONE	PORTATA (l/sec)	PEND. PIEZ. (m/Km)	VEL. (m/sec)	QUOTA MONTE (ms.m.)	QUOTA VALLE (ms.m.)	PERDITA CARICO (m)	QUOTA IMPOSTA (ms.m.)	QUOTA TERRENO (ms.m.)	PRESSIONE (m)	CARICO RESIDUO (m)
RIP-H1	0	1	315	3	PEAD/PN10	80	5.66	1.32	208.32	208.3	0.02	---	---	---	---
RIP-H2	1	2	250	121.36	PEAD/PN10	24	1.68	0.62	208.3	208.1	0.2	---	---	---	---
RIP-H3	1	3	250	275.35	PEAD/PN10	24	1.68	0.62	208.3	207.84	0.46	---	---	---	---
RIP-H1	1	4	250	216.04	PEAD/PN10	32	2.98	0.83	208.3	207.66	0.64	---	---	---	---
RIP-H1	4	5	250	466.84	PEAD/PN10	32	2.98	0.83	207.66	206.27	1.39	---	---	---	---
94	2	6	250	2	PEAD/PN10	24	1.68	0.62	208.1	208.1	0	---	---	---	---
94	6	7	250	30.2	PEAD/PN10	24	1.68	0.62	208.1	208.05	0.05	---	---	---	---
94	7	8	200	29	PEAD/PN10	24	5.53	0.98	208.05	0.16	---	---	---	---	---
94	7	8	160	29.93	PEAD/PN10	24	20.87	1.54	207.89	207.26	0.62	---	---	---	---
94	8	9	160	67.26	PEAD/PN10	16	9.25	1.02	207.26	206.64	0.62	---	---	---	---
94	9	10	125	73.7	PEAD/PN10	8	8.67	0.84	206.64	206	0.64	206	201.2	4.8	0
94	7	11	250	32.63	PEAD/PN10	24	1.68	0.62	208.05	207.99	0.05	---	---	---	---
94	11	12	250	66.48	PEAD/PN10	24	1.68	0.62	207.99	207.88	0.11	---	---	---	---
94	12	13	250	59	PEAD/PN10	24	1.68	0.62	207.88	0.1	---	---	---	---	---
94	12	13	200	32.05	PEAD/PN10	24	5.55	0.98	207.78	207.6	0.18	---	---	---	---
94	13	14	200	41.3	PEAD/PN10	24	5.55	0.98	207.6	207.37	0.23	---	---	---	---
94	14	15	200	44.49	PEAD/PN10	24	5.55	0.98	207.37	207.13	0.25	---	---	---	---
94	15	16	160	55.28	PEAD/PN10	8	2.31	0.51	207.13	207	0.13	207	192.5	14.5	0
94	15	17	200	58.69	PEAD/PN10	24	5.55	0.98	207.13	206.8	0.33	---	---	---	---
94	17	18	200	131.59	PEAD/PN10	24	5.55	0.98	206.8	206.07	0.73	---	---	---	---
94	18	19	160	81.55	PEAD/PN10	24	20.81	1.54	206.07	204.37	1.7	---	---	---	---
94	19	20	160	77.51	PEAD/PN10	16	9.25	1.02	204.37	203.66	0.72	---	---	---	---
94	20	21	110	16.1	PEAD/PN10	8	17.42	1.09	203.66	203.38	0.28	199.8	179.8	23.58	3.58
94	20	22	110	93.66	PEAD/PN10	8	17.42	1.09	203.66	202.03	1.63	196.7	176.7	25.33	5.33
94	20	23	160	61.19	PEAD/PN10	24	20.81	1.54	203.66	202.39	1.27	---	---	---	---
94	23	24	140	6.18	PEAD/PN10	16	18.88	1.34	202.39	202.27	0.12	---	---	---	---
94	24	25	125	73.83	PEAD/PN10	8	8.67	0.84	202.27	201.63	0.64	201.6	181.6	20.03	0.03
94	24	26	110	124.98	PEAD/PN10	8	17.42	1.09	202.27	200.09	2.18	199.4	179.4	20.69	0.69
94	6	27	250	83.33	PEAD/PN10	24	1.68	0.62	208.1	207.96	0.14	---	---	---	---
94	27	28	200	10	PEAD/PN10	16	2.39	0.66	207.96	0.02	---	---	---	---	---
94	27	28	160	64.42	PEAD/PN10	16	9.29	1.02	207.93	207.33	0.6	---	---	---	---
94	28	29	140	70.79	PEAD/PN10	8	4.72	0.67	207.33	207	0.33	207	188	19	---
94	28	30	125	22	PEAD/PN10	8	8.67	0.84	207.33	207.14	0.19	207	190.5	16.64	0.14
94	27	31	250	35	PEAD/PN10	24	1.68	0.62	207.96	0.06	---	---	---	---	---
94	27	31	200	10.04	PEAD/PN10	24	5.55	0.98	207.9	207.84	0.06	---	---	---	---
94	31	32	110	13.99	PEAD/PN10	8	17.42	1.09	207.84	207.6	0.24	207	192.6	15	0.6
94	31	33	200	90.61	PEAD/PN10	24	5.55	0.98	207.84	207.34	0.5	---	---	---	---
94	33	34	160	60.91	PEAD/PN10	8	2.31	0.51	207.34	207.2	0.14	207.2	187.2	20	0
94	33	35	200	55.38	PEAD/PN10	24	5.55	0.98	207.34	207.03	0.31	---	---	---	---
94	35	36	160	65.18	PEAD/PN10	24	20.81	1.54	207.03	205.68	1.36	---	---	---	---
94	36	37	110	20.48	PEAD/PN10	8	17.42	1.09	205.68	205.32	0.36	201.8	181.8	23.52	3.52
94	36	38	110	99.23	PEAD/PN10	8	17.42	1.09	205.68	203.95	1.73	201.8	181.8	22.15	2.15
94	36	39	160	74.17	PEAD/PN10	24	20.81	1.54	205.68	204.13	1.54	---	---	---	---
94	39	40	160	11.37	PEAD/PN10	24	20.81	1.54	204.13	203.9	0.24	---	---	---	---
94	40	41	125	46.32	PEAD/PN10	16	34.67	1.68	203.9	202.29	1.61	---	---	---	---
94	41	42	110	44.55	PEAD/PN10	8	17.42	1.09	202.29	201.51	0.78	196.8	176.8	24.71	4.71
94	41	43	110	123.09	PEAD/PN10	8	17.42	1.09	202.29	200.15	2.14	196	176	24.15	4.15
94	40	44	140	90	PEAD/PN10	16	18.88	1.34	203.9	1.7	---	---	---	---	---
94	40	44	125	14.05	PEAD/PN10	16	34.68	1.68	202.2	201.71	0.49	---	---	---	---
94	44	45	110	98.25	PEAD/PN10	8	17.42	1.09	201.71	200	1.71	200	181	19	0
94	35	46	200	184.77	PEAD/PN10	24	5.55	0.98	207.03	206.01	1.02	---	---	---	---
94	46	47	200	53	PEAD/PN10	24	5.55	0.98	206.01	0.29	---	---	---	---	---
94	46	47	160	9.35	PEAD/PN10	24	20.81	1.54	205.71	205.52	0.19	---	---	---	---
94	47	48	110	97.97	PEAD/PN10	8	17.42	1.09	205.52	203.81	1.71	200	180	23.81	3.81
94	47	49	160	82.78	PEAD/PN10	24	20.81	1.54	205.52	203.8	1.72	---	---	---	---
94	49	50	160	84.39	PEAD/PN10	16	9.25	1.02	203.8	203.02	0.78	---	---	---	---
94	50	51	125	117.69	PEAD/PN10	8	8.67	0.84	203.02	202	1.02	202	182.3	19.7	0
94	50	52	125	168	PEAD/PN10	8	8.65	0.84	203.02	1.45	---	---	---	---	---
94	50	52	110	37.99	PEAD/PN10	8	17.54	1.09	201.56	200.9	0.67	200.9	180.9	20	---
96	3	53	250	2	PEAD/PN10	24	1.68	0.62	207.84	207.84	0	---	---	---	---
96	53	54	250	18	PEAD/PN10	24	1.64	0.62	207.84	0.03	---	---	---	---	---
96	53	54	200	12.7	PEAD/PN10	24	5.71	0.98	207.81	207.74	0.07	---	---	---	---
96	54	55	125	54	PEAD/PN10	8	8.67	0.84	207.74	0.47	---	---	---	---	---
96	54	55	110	15.41	PEAD/PN10	8	17.42	1.09	207.27	207	0.27	207	192.3	14.7	---
96	54	56	200	58.69	PEAD/PN10	24	5.55	0.98	207.74	207.41	0.33	---	---	---	---
96	56	57	140	15	PEAD/PN10	8	4.67	0.67	207.41	0.07	---	---	---	---	---
96	56	57	125	39.13	PEAD/PN10	8	8.7	0.84	207.34	207	0.34	207	194.2	12.8	---
96	56	58	200	17.29	PEAD/PN10	24	5.55	0.98	207.41	207.31	0.1	---	---	---	---
96	58	59	160	69.29	PEAD/PN10	8	2.31	0.51	207.31	207.15	0.16	207	189.4	17.75	0.15
96	58	60	200	50.73	PEAD/PN10	16	2.47	0.66	207.31	207.19	0.13	---	---	---	---
96	60	61	160	82.01	PEAD/PN10	8	2.31	0.51	207.19	207	0.19	207	187.4	19.6	---
96	60	62	140	32	PEAD/PN10	8	4.72	0.67	207.19	0.15	---	---	---	---	---
96	60	62	125	119.85	PEAD/PN10	8	8.67	0.84	207.04	206	1.04	206	186	20	---

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96	53	63	250	57.08	PEAD/PN10	24	1.68	0.62	207.84	207.74	0.1	---	---	---	---
96	63	64	140	19	PEAD/PN10	8	4.72	0.67	207.74	0.09	---	---	---	---	---
96	63	64	125	75.43	PEAD/PN10	8	8.67	0.84	207.65	207	0.65	207	199.2	7.8	---
96	63	65	250	120.36	PEAD/PN10	24	1.68	0.62	207.74	207.54	0.2	---	---	---	---
96	65	66	250	51.62	PEAD/PN10	24	1.68	0.62	207.54	207.45	0.09	---	---	---	---
96	66	67	160	37.91	PEAD/PN10	8	2.31	0.51	207.45	207.37	0.09	207	193.1	14.27	0.37
96	67	68	250	97.65	PEAD/PN10	24	1.68	0.62	207.37	207.2	0.16	---	---	---	---
96	68	69	250	67	PEAD/PN10	24	1.66	0.62	207.2	0.11	---	---	---	---	---
96	68	69	200	67.5	PEAD/PN10	24	5.58	0.98	207.09	206.71	0.38	---	---	---	---
96	69	70	200	107.67	PEAD/PN10	24	5.55	0.98	206.71	206.12	0.6	---	---	---	---
96	70	71	200	16.14	PEAD/PN10	24	5.55	0.98	206.12	206.03	0.09	---	---	---	---
96	71	72	160	11.97	PEAD/PN10	8	2.31	0.51	206.03	206	0.03	206	190.2	15.8	0
96	71	73	200	12	PEAD/PN10	16	2.4	0.66	206.03	0.03	---	---	---	---	---
96	71	73	160	76.85	PEAD/PN10	16	9.28	1.02	206	205.29	0.71	---	---	---	---
96	73	74	160	123.43	PEAD/PN10	8	2.31	0.51	205.29	205	0.29	205	185	20	0
96	68	75	250	19.76	PEAD/PN10	24	1.68	0.62	207.2	207.17	0.03	---	---	---	---
96	75	76	160	38.3	PEAD/PN10	8	2.31	0.51	207.17	207.08	0.09	207	195.5	11.58	0.08
96	75	77	250	153.62	PEAD/PN10	24	1.68	0.62	207.17	206.91	0.26	---	---	---	---
96	77	78	250	76.72	PEAD/PN10	24	1.68	0.62	206.91	206.78	0.13	---	---	---	---
96	78	79	110	23.85	PEAD/PN10	8	17.42	1.09	206.78	206.37	0.42	206	194.3	12.07	0.37
96	78	80	250	26.13	PEAD/PN10	24	1.68	0.62	206.78	206.74	0.04	---	---	---	---
96	80	81	125	31	PEAD/PN10	8	8.67	0.84	206.74	0.27	---	---	---	---	---
96	80	81	110	27.23	PEAD/PN10	8	17.42	1.09	206.47	206	0.47	206	192.7	13.3	---
96	80	82	250	35.82	PEAD/PN10	24	1.68	0.62	206.74	206.68	0.06	---	---	---	---
96	82	83	200	77.14	PEAD/PN10	24	5.55	0.98	206.68	206.25	0.43	---	---	---	---
96	83	84	125	16	PEAD/PN10	8	8.4	0.84	206.25	0.13	---	---	---	---	---
96	83	84	110	6.26	PEAD/PN10	8	18.78	1.09	206.12	206	0.12	206	191.7	14.3	---
96	83	85	200	26	PEAD/PN10	24	5.55	0.98	206.25	0.14	---	---	---	---	---
96	83	85	160	42.17	PEAD/PN10	24	20.81	1.54	206.11	205.23	0.88	---	---	---	---
96	85	86	160	138.02	PEAD/PN10	16	9.25	1.02	205.23	203.95	1.28	---	---	---	---
96	86	87	125	133.19	PEAD/PN10	8	8.67	0.84	203.95	202.8	1.15	202.8	182.8	20	0
96	82	88	250	120.78	PEAD/PN10	24	1.68	0.62	206.68	206.48	0.2	---	---	---	---
96	88	89	250	33.98	PEAD/PN10	24	1.68	0.62	206.48	206.42	0.06	---	---	---	---
96	89	90	125	33	PEAD/PN10	8	8.55	0.84	206.42	0.28	---	---	---	---	---
96	89	90	110	7.49	PEAD/PN10	8	18.48	1.09	206.14	206	0.14	206	194.4	11.6	---
96	89	91	250	71.43	PEAD/PN10	24	1.68	0.62	206.42	206.3	0.12	---	---	---	---
96	91	92	140	36	PEAD/PN10	8	4.72	0.67	206.3	0.17	---	---	---	---	---
96	91	92	125	15.22	PEAD/PN10	8	8.67	0.84	206.13	206	0.13	206	192.8	13.2	---
96	91	93	250	55	PEAD/PN10	24	1.68	0.62	206.3	0.09	---	---	---	---	---
96	91	93	200	13.82	PEAD/PN10	24	5.55	0.98	206.21	206.13	0.08	---	---	---	---
96	93	94	160	57.42	PEAD/PN10	8	2.31	0.51	206.13	206	0.13	206	191.1	14.9	0
96	93	95	200	34.34	PEAD/PN10	24	5.55	0.98	206.13	205.94	0.19	---	---	---	---
96	95	96	125	57	PEAD/PN10	8	8.66	0.84	205.94	0.49	---	---	---	---	---
96	95	96	110	25.73	PEAD/PN10	8	17.43	1.09	205.45	205	0.45	205	190.1	14.9	---
96	95	97	200	35	PEAD/PN10	16	2.46	0.66	205.94	0.09	---	---	---	---	---
96	95	97	160.0	60.62	PEAD/PN10	16	9.26	1.02	205.86	205.29	0.56	---	---	---	---
96	97	98	140.0	62.46	PEAD/PN10	8	4.72	0.67	205.29	205	0.29	205	186.7	18.3	0
96	97	99	125.0	39	PEAD/PN10	8	8.67	0.84	205.29	0.34	---	---	---	---	---
96	97	99	110.0	78.1	PEAD/PN10	8	17.42	1.09	204.96	203.6	1.36	203.6	183.6	20	---
96	88	100	250.0	26.39	PEAD/PN10	24	1.68	0.62	206.48	206.43	0.04	---	---	---	---
96	100	101	110.0	7.66	PEAD/PN10	8	17.42	1.09	206.43	206.3	0.13	205	196.7	9.6	1.3
96	100	102	250.0	109.65	PEAD/PN10	24	1.68	0.62	206.43	206.25	0.18	---	---	---	---
96	102	103	250.0	73.62	PEAD/PN10	24	1.68	0.62	206.25	206.13	0.12	---	---	---	---
96	103	104	110.0	53.26	PEAD/PN10	8	17.42	1.09	206.13	205.2	0.93	205	194.2	11	0.2
96	103	105	250.0	74	PEAD/PN10	24	1.68	0.62	206.13	0.12	---	---	---	---	---
96	103	105	200.0	130.58	PEAD/PN10	24	5.55	0.98	206	205.28	0.72	---	---	---	---
96	105	106	200.0	66.45	PEAD/PN10	16	2.47	0.66	205.28	205.11	0.16	---	---	---	---
96	106	107	160.0	18	PEAD/PN10	8	2.31	0.51	205.11	0.04	---	---	---	---	---
96	106	107	140.0	15.6	PEAD/PN10	8	4.72	0.67	205.07	205	0.07	205	188.3	16.7	---
96	106	108	160.0	49.85	PEAD/PN10	8	2.31	0.51	205.11	205	0.12	205	187.3	17.7	0
96	102	109	250.0	16.05	PEAD/PN10	24	1.68	0.62	206.25	206.22	0.03	---	---	---	---
96	109	110	250.0	238.01	PEAD/PN10	24	1.68	0.62	206.22	205.82	0.4	---	---	---	---
96	110	111	200.0	12.45	PEAD/PN10	24	5.55	0.98	205.82	205.75	0.07	---	---	---	---
96	111	112	200.0	74.93	PEAD/PN10	24	5.55	0.98	205.75	205.34	0.42	---	---	---	---
96	112	113	200.0	23	PEAD/PN10	16	2.42	0.66	205.34	0.06	---	---	---	---	---
96	112	113	160.0	13.79	PEAD/PN10	16	9.5	1.02	205.28	205.15	0.13	---	---	---	---
96	113	114	160.0	65.77	PEAD/PN10	8	2.31	0.51	205.15	205	0.15	205	190.9	14.1	---
96	110	115	250.0	20.65	PEAD/PN10	24	1.68	0.62	205.82	205.79	0.03	---	---	---	---
96	115	116	110.0	12.82	PEAD/PN10	8	17.42	1.09	205.79	205.57	0.22	205	197.2	8.37	0.57
96	115	117	250.0	85.72	PEAD/PN10	24	1.68	0.62	205.79	205.65	0.14	---	---	---	---
96	117	118	110.0	19.3	PEAD/PN10	8	17.42	1.09	205.65	205.31	0.34	205	196.1	9.21	0.31
96	117	119	250.0	64.76	PEAD/PN10	24	1.68	0.62	205.65	205.54	0.11	---	---	---	---
96	119	120	110.0	25.48	PEAD/PN10	8	17.42	1.09	205.54	205.09	0.44	205	196.5	8.59	0.09
96	119	121	250.0	13.91	PEAD/PN10	24	1.68	0.62	205.54	205.51	0.02	---	---	---	---
96	121	122	200.0	24	PEAD/PN10	16	2.46	0.66	205.51	0.06	---	---	---	---	---

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96	121	122	160.0	8.78	PEAD/PN10	16	9.34	1.02	205.45	205.37	0.08	---	---	---	---
96	122	123	110.0	20.34	PEAD/PN10	8	17.42	1.09	205.37	205.02	0.35	205	195	10.02	0.02
96	122	124	140.0	78.89	PEAD/PN10	8	4.72	0.67	205.37	205	0.37	205	193.4	11.6	0
96	121	125	250.0	22	PEAD/PN10	24	1.68	0.62	205.51	0.04	---	---	---	---	---
96	121	125	200.0	59.13	PEAD/PN10	24	5.55	0.98	205.48	205.15	0.33	---	---	---	---
96	125	126	140.0	29.54	PEAD/PN10	8	4.72	0.67	205.15	205.01	0.14	205	195.1	9.91	0.01
96	125	127	250.0	61.56	PEAD/PN10	24	1.68	0.62	205.15	205.05	0.1	---	---	---	---
96	127	128	160.0	20.12	PEAD/PN10	8	2.31	0.51	205.05	205	0.05	205	196.2	8.8	0
96	127	129	200.0	43.95	PEAD/PN10	16	2.47	0.66	205.05	204.94	0.11	---	---	---	---
96	129	130	125.0	56.45	PEAD/PN10	8	8.67	0.84	204.94	204.45	0.49	204	194.5	9.95	0.45
96	129	131	160.0	43	PEAD/PN10	8	2.31	0.51	204.94	0.1	---	---	---	---	---
96	129	131	140.0	177.69	PEAD/PN10	8	4.72	0.67	204.84	204	0.84	204	197	7	---
96	70	132	110.0	36.81	PEAD/PN10	8	17.42	1.09	206.12	205.48	0.64	205	190	15.48	0.48
96	77	133	110.0	55.49	PEAD/PN10	8	17.42	1.09	206.91	205.95	0.97	205	196.5	9.45	0.95
96	109	134	110.0	11.26	PEAD/PN10	8	17.42	1.09	206.22	206.03	0.2	205	197.3	8.73	1.03
95bis	5	135	250.0	2	PEAD/PN10	32	2.98	0.83	206.27	206.26	0.01	---	---	---	---
95bis	135	136	250.0	61.24	PEAD/PN10	32	2.98	0.83	206.26	206.08	0.18	---	---	---	---
95bis	136	137	200.0	46.32	PEAD/PN10	32	9.86	1.31	206.08	205.62	0.46	---	---	---	---
95bis	137	138	200.0	91.01	PEAD/PN10	32	9.86	1.31	205.62	204.73	0.9	---	---	---	---
95bis	138	139	110.0	17.24	PEAD/PN10	8	17.42	1.09	204.73	204.43	0.3	190.4	170.4	34.03	14.03
95bis	138	140	200.0	17.87	PEAD/PN10	32	9.86	1.31	204.73	204.55	0.18	---	---	---	---
95bis	140	141	125.0	68.06	PEAD/PN10	16	34.67	1.68	204.55	202.19	2.36	---	---	---	---
95bis	141	142	110.0	92.21	PEAD/PN10	8	17.42	1.09	202.19	200.58	1.61	191.5	166.5	34.08	9.08
95bis	141	143	110.0	34.45	PEAD/PN10	8	17.42	1.09	202.19	201.59	0.6	191.5	166.5	35.09	10.09
95bis	140	144	200.0	106.04	PEAD/PN10	32	9.86	1.31	204.55	203.5	1.05	---	---	---	---
95bis	144	145	200.0	129.59	PEAD/PN10	32	9.86	1.31	203.5	202.23	1.28	---	---	---	---
95bis	145	146	110.0	51.19	PEAD/PN10	8	17.42	1.09	202.23	201.33	0.89	189	164	37.33	12.33
95bis	145	147	160.0	104.74	PEAD/PN10	24	20.81	1.54	202.23	200.05	2.18	---	---	---	---
95bis	147	148	125.0	148.55	PEAD/PN10	16	34.67	1.68	200.05	194.9	5.15	---	---	---	---
95bis	148	149	110.0	70.48	PEAD/PN10	8	17.42	1.09	194.9	193.67	1.23	182	157	36.67	11.67
95bis	136	150	250.0	16.93	PEAD/PN10	32	2.98	0.83	206.08	206.03	0.05	---	---	---	---
95bis	150	151	110.0	18.34	PEAD/PN10	8	17.42	1.09	206.03	205.71	0.32	192.5	172.5	33.21	13.21
95bis	150	152	250.0	123.99	PEAD/PN10	32	2.98	0.83	206.03	205.66	0.37	---	---	---	---
95bis	152	153	250.0	145.79	PEAD/PN10	32	2.98	0.83	205.66	205.23	0.43	---	---	---	---
95bis	153	154	110.0	56.64	PEAD/PN10	8	17.42	1.09	205.23	204.24	0.99	191.3	171.3	32.94	12.94
95bis	153	155	200.0	159.4	PEAD/PN10	32	9.86	1.31	205.23	203.65	1.57	---	---	---	---
95bis	155	156	110.0	97.72	PEAD/PN10	8	17.42	1.09	203.65	201.95	1.7	193	168	33.95	8.95
95bis	155	157	200.0	146.26	PEAD/PN10	32	9.86	1.31	203.65	202.21	1.44	---	---	---	---
95bis	157	158	110.0	129.99	PEAD/PN10	8	17.42	1.09	202.21	199.95	2.26	191.4	166.4	33.55	8.55
95bis	157	159	200.0	102.37	PEAD/PN10	32	9.86	1.31	202.21	201.2	1.01	---	---	---	---
95bis	159	160	110.0	78.93	PEAD/PN10	8	17.42	1.09	201.2	199.83	1.37	190	165	34.83	9.83
95bis	159	161	200.0	56.87	PEAD/PN10	32	9.86	1.31	201.2	200.64	0.56	---	---	---	---
95bis	161	162	110.0	40.8	PEAD/PN10	8	17.42	1.09	200.64	199.93	0.71	187.6	162.6	37.33	12.33
95bis	161	163	200.0	43.5	PEAD/PN10	32	9.86	1.31	200.64	200.21	0.43	---	---	---	---
95bis	163	164	110.0	57.26	PEAD/PN10	8	17.42	1.09	200.21	199.21	1	190.2	165.2	34.01	9.01
95bis	163	165	200.0	65.5	PEAD/PN10	32	9.86	1.31	200.21	199.57	0.65	---	---	---	---
95bis	165	166	110.0	41.95	PEAD/PN10	8	17.42	1.09	199.57	198.84	0.73	187.5	162.5	36.34	11.34
95bis	165	167	200.0	25.91	PEAD/PN10	32	9.86	1.31	199.57	199.31	0.26	---	---	---	---
95bis	167	168	110.0	20.76	PEAD/PN10	8	17.42	1.09	199.31	198.95	0.36	188	163	35.95	10.95
95bis	167	169	200.0	34.38	PEAD/PN10	32	9.86	1.31	199.31	198.97	0.34	---	---	---	---
95bis	169	170	110.0	24.82	PEAD/PN10	8	17.42	1.09	198.97	198.54	0.43	187	162	36.54	11.54
95bis	169	171	200.0	74.76	PEAD/PN10	32	9.86	1.31	198.97	198.23	0.74	---	---	---	---
95bis	171	172	110.0	49.66	PEAD/PN10	8	17.42	1.09	198.23	197.37	0.86	183	158	39.37	14.37
95bis	171	173	110.0	91.72	PEAD/PN10	8	17.42	1.09	198.23	196.64	1.6	180	155	41.64	16.64
95bis	171	174	200.0	85.97	PEAD/PN10	32	9.86	1.31	198.23	197.39	0.85	---	---	---	---
95bis	174	175	110.0	48.96	PEAD/PN10	8	17.42	1.09	197.39	196.53	0.85	181	156	40.53	15.53
95bis	174	176	200.0	93.85	PEAD/PN10	32	9.86	1.31	197.39	196.46	0.93	---	---	---	---
95bis	176	177	110.0	66.18	PEAD/PN10	8	17.42	1.09	196.46	195.31	1.15	176.7	151.7	43.61	18.61
95bis	176	178	160.0	135.46	PEAD/PN10	24	20.81	1.54	196.46	193.64	2.82	---	---	---	---
95bis	178	179	110.0	57.31	PEAD/PN10	8	17.42	1.09	193.64	192.64	1	175.7	150.7	41.94	16.94
95bis	178	180	125.0	80.3	PEAD/PN10	16	34.67	1.68	193.64	190.86	2.78	---	---	---	---
95bis	180	181	110.0	107.03	PEAD/PN10	8	17.42	1.09	190.86	189	1.86	180.5	155.5	33.5	8.5
95bis	153	182	250.0	54.47	PEAD/PN10	32	2.98	0.83	205.23	205.06	0.16	---	---	---	---
95bis	182	183	250.0	107.91	PEAD/PN10	32	2.98	0.83	205.06	204.74	0.32	---	---	---	---
95bis	183	184	200.0	42.8	PEAD/PN10	32	9.86	1.31	204.74	204.32	0.42	---	---	---	---
95bis	184	185	110.0	46.31	PEAD/PN10	8	17.42	1.09	204.32	203.51	0.81	194	174	29.51	9.51
95bis	184	186	160.0	36.08	PEAD/PN10	24	20.81	1.54	204.32	203.57	0.75	---	---	---	---
95bis	186	187	110.0	59.59	PEAD/PN10	8	17.42	1.09	203.57	202.53	1.04	198	178	24.53	4.53
95bis	186	188	125.0	28.99	PEAD/PN10	16	34.67	1.68	203.57	202.56	1	---	---	---	---
95bis	188	189	110.0	51.58	PEAD/PN10	8	17.42	1.09	202.56	201.67	0.9	197	177	24.67	4.67
95bis	188	190	110.0	60.6	PEAD/PN10	8	17.42	1.09	202.56	201.51	1.06	194.3	174.3	27.21	7.21
95bis	183	191	250.0	115.9	PEAD/PN10	32	2.98	0.83	204.74	204.4	0.35	---	---	---	---
95bis	191	192	110.0	22.69	PEAD/PN10	8	17.42	1.09	204.4	204	0.4	190.9	170.9	33.1	13.1
95bis	191	193	250.0	102.05	PEAD/PN10	32	2.98	0.83	204.4	204.09	0.3	---	---	---	---
95bis	193	194	110.0	19.81	PEAD/PN10	8	17.42	1.09	204.09	203.75	0.35	191.4	171.4	32.35	12.35

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95bis	193	195	250.0	57.55	PEAD/PN10	32	2.98	0.83	204.09	203.92	0.17	---	---	---	---
95bis	195	196	200.0	29.25	PEAD/PN10	32	9.86	1.31	203.92	203.63	0.29	---	---	---	---
95bis	196	197	110.0	27.99	PEAD/PN10	8	17.42	1.09	203.63	203.14	0.49	190.2	170.2	32.94	12.94
95bis	196	198	160.0	85.51	PEAD/PN10	24	20.81	1.54	203.63	201.85	1.78	---	---	---	---
95bis	198	199	110.0	12.22	PEAD/PN10	8	17.42	1.09	201.85	201.64	0.21	194.8	169.8	31.84	6.84
95bis	198	200	125.0	62.12	PEAD/PN10	16	34.67	1.68	201.85	199.7	2.15	---	---	---	---
95bis	200	201	110.0	23.5	PEAD/PN10	8	17.42	1.09	199.7	199.29	0.41	192	167	32.29	7.29
95bis	200	202	110.0	145.68	PEAD/PN10	8	17.42	1.09	199.7	197.16	2.54	188.4	163.4	33.76	8.76
95bis	195	203	250.0	30	PEAD/PN10	32	2.96	0.83	203.92	0.09	---	---	---	---	---
95bis	195	203	200.0	63.16	PEAD/PN10	32	9.89	1.31	203.83	203.21	0.62	---	---	---	---
95bis	203	204	110.0	64.19	PEAD/PN10	8	17.42	1.09	203.21	202.09	1.12	194.5	169.5	32.59	7.59
95bis	203	205	200.0	56.93	PEAD/PN10	32	9.86	1.31	203.21	202.65	0.56	---	---	---	---
95bis	205	206	110.0	42.64	PEAD/PN10	8	17.42	1.09	202.65	201.9	0.74	191.5	171.5	30.4	10.4
95bis	205	207	200.0	101.34	PEAD/PN10	32	9.86	1.31	202.65	201.65	1	---	---	---	---
95bis	207	208	200.0	45.33	PEAD/PN10	32	9.86	1.31	201.65	201.2	0.45	---	---	---	---
95bis	208	209	140.0	18	PEAD/PN10	16	18.88	1.34	201.2	0.34	---	---	---	---	---
95bis	208	209	125.0	130.58	PEAD/PN10	16	34.67	1.68	200.86	196.33	4.53	---	---	---	---
95bis	209	210	110.0	76.58	PEAD/PN10	8	17.42	1.09	196.33	195	1.33	195	175	20	0
95bis	209	211	110.0	76.9	PEAD/PN10	8	17.42	1.09	196.33	194.99	1.34	192.8	172.8	22.19	2.19
95bis	208	212	200.0	27.06	PEAD/PN10	32	9.86	1.31	201.2	200.93	0.27	---	---	---	---
95bis	212	213	200.0	53.89	PEAD/PN10	32	9.86	1.31	200.93	200.4	0.53	---	---	---	---
95bis	213	214	110.0	66.76	PEAD/PN10	8	17.42	1.09	200.4	199.24	1.16	198.1	178.1	21.14	1.14
95bis	213	215	200.0	43.44	PEAD/PN10	24	5.55	0.98	200.4	200.16	0.24	---	---	---	---
95bis	215	216	160.0	69.26	PEAD/PN10	8	2.31	0.51	200.16	200	0.16	200	182.9	17.1	---
95bis	215	217	200.0	37.52	PEAD/PN10	16	2.47	0.66	200.16	200.07	0.09	---	---	---	---
95bis	217	218	160.0	9	PEAD/PN10	8	2.31	0.51	200.07	0.02	---	---	---	---	---
95bis	217	218	140.0	10.08	PEAD/PN10	8	4.72	0.67	200.05	200	0.05	200	180.6	19.4	---
95bis	217	219	140.0	135.2	PEAD/PN10	8	4.72	0.67	200.07	199.43	0.64	198.9	178.9	20.53	0.53

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“Ammodernamento della rete irrigua dello Jato – I lotto sotto sollevamento” - Progetto Definitivo
Relazione dei calcoli idraulici

Risultati dei calcoli di ottimizzazione della rete di distribuzione a valle della Derivazione

I

Consorzio di Bonifica n.2 - Palermo

"Ammodernamento della rete irrigua dello Jato – I lotto sotto sollevamento" - Progetto Definitivo
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COMIZIO	NODO MONTE	NODO VALLE	DIAMETRO	LUNG.	TIPO TUBAZIONE	PORTATA	PEND. PIEZ.	VEL.	QUOTA MONTE	QUOTA VALLE	PERDITA CARICO	QUOTA IMPOSTA	QUOTA TERRENO	PRESSIONE	CARICO RESIDUO
			(mm)	(m)		(l/sec)	(m/Km)	(m/sec)	(ms.m.)	(ms.m.)	(m)	(ms.m.)	(ms.m.)	(m)	(m)
RIP-I1	0	1	355	238.37	PEAD/PN10	96	4.36	1.25	207.45	206.41	1.04	---	---	---	---
RIP-I1	1	2	315	147.77	PEAD/PN10	72	4.58	1.19	206.41	205.73	0.68	---	---	---	---
RIP-I1	2	3	250	569.62	PEAD/PN10	48	6.7	1.25	205.73	201.91	3.82	---	---	---	---
RIP-I1	3	4	200	428.89	PEAD/PN10	24	5.55	0.98	201.91	199.54	2.38	---	---	---	---
RIP-I2	2	5	250	22.46	PEAD/PN10	24	1.68	0.62	205.73	205.7	0.04	---	---	---	---
RIP-I3	3	6	200	488.8	PEAD/PN10	24	5.55	0.98	201.91	199.2	2.71	---	---	---	---
98bis	1	7	250	2	PEAD/PN10	24	1.68	0.62	206.41	206.41	0	---	---	---	---
98bis	7	8	250	96.28	PEAD/PN10	24	1.68	0.62	206.41	206.25	0.16	---	---	---	---
98bis	8	9	250	110.75	PEAD/PN10	24	1.68	0.62	206.25	206.06	0.19	---	---	---	---
98bis	9	10	125	62	PEAD/PN10	8	8.67	0.84	206.06		0.54	---	---	---	---
98bis	9	10	110	30.07	PEAD/PN10	8	17.42	1.09	205.52	205	0.52	205	192.5	12.5	---
98bis	9	11	250	42.02	PEAD/PN10	24	1.68	0.62	206.06	205.99	0.07	---	---	---	---
98bis	11	12	125	70	PEAD/PN10	8	8.67	0.84	205.99		0.61	---	---	---	---
98bis	11	12	110	22.19	PEAD/PN10	8	17.42	1.09	205.38	205	0.39	205	192.2	12.8	---
98bis	11	13	250	41	PEAD/PN10	24	1.68	0.62	205.99		0.07	---	---	---	---
98bis	11	13	200	31.55	PEAD/PN10	24	5.55	0.98	205.92	205.75	0.18	---	---	---	---
98bis	13	14	160	23.75	PEAD/PN10	16	9.25	1.02	205.75	205.53	0.22	---	---	---	---
98bis	14	15	140	77	PEAD/PN10	8	4.71	0.67	205.53		0.36	---	---	---	---
98bis	14	15	125	18.74	PEAD/PN10	8	8.76	0.84	205.16	205	0.16	205	189.8	15.2	---
98bis	13	16	200	59.9	PEAD/PN10	24	5.55	0.98	205.75	205.41	0.33	---	---	---	---
98bis	16	17	140	35	PEAD/PN10	8	4.72	0.67	205.41		0.17	---	---	---	---
98bis	16	17	125	28.91	PEAD/PN10	8	8.67	0.84	205.25	205	0.25	205	187.5	17.5	---
98bis	16	18	200	184.06	PEAD/PN10	24	5.55	0.98	205.41	204.39	1.02	---	---	---	---
98bis	18	19	140	74.05	PEAD/PN10	16	18.88	1.34	204.39	202.99	1.4	---	---	---	---
98bis	19	20	125	10	PEAD/PN10	8	8.67	0.84	202.99		0.09	---	---	---	---
98bis	19	20	110	52.27	PEAD/PN10	8	17.42	1.09	202.91	202	0.91	202	182	20	---
98bis	19	21	110	79.75	PEAD/PN10	8	17.42	1.09	202.99	201.61	1.39	200	180	21.61	1.61
98bis	18	22	160	83.53	PEAD/PN10	8	2.31	0.51	204.39	204.2	0.19	204.2	184.2	20	0
98bis	7	23	250	69.42	PEAD/PN10	24	1.68	0.62	206.41	206.29	0.12	---	---	---	---
98bis	23	24	110	30.04	PEAD/PN10	8	17.42	1.09	206.29	205.77	0.52	205	188.8	16.97	0.77
98bis	23	25	250	46.66	PEAD/PN10	24	1.68	0.62	206.29	206.21	0.08	---	---	---	---
98bis	25	26	250	38.77	PEAD/PN10	24	1.68	0.62	206.21	206.15	0.06	---	---	---	---
98bis	26	27	110	45.14	PEAD/PN10	8	17.42	1.09	206.15	205.36	0.79	205	190.1	15.26	0.36
98bis	26	28	250	122.88	PEAD/PN10	24	1.68	0.62	206.15	205.94	0.21	---	---	---	---
98bis	28	29	110	111.22	PEAD/PN10	8	17.42	1.09	205.94	204	1.94	203.8	183.8	20.2	0.2
98bis	28	30	200	6.85	PEAD/PN10	24	5.55	0.98	205.94	205.9	0.04	---	---	---	---
98bis	30	31	125	36	PEAD/PN10	8	8.64	0.84	205.9		0.31	---	---	---	---
98bis	30	31	110	33.93	PEAD/PN10	8	17.48	1.09	205.59	205	0.59	205	188.5	16.5	---
98bis	30	32	200	72.28	PEAD/PN10	24	5.55	0.98	205.9	205.5	0.4	---	---	---	---
98bis	32	33	125	37	PEAD/PN10	8	8.62	0.84	205.5		0.32	---	---	---	---
98bis	32	33	110	10.38	PEAD/PN10	8	17.74	1.09	205.18	205	0.18	205	186.2	18.8	---
98bis	32	34	200	36.5	PEAD/PN10	24	5.55	0.98	205.5	205.3	0.2	---	---	---	---
98bis	34	35	110	39.02	PEAD/PN10	8	17.42	1.09	205.3	204.62	0.68	204.5	184.5	20.12	0.12
98bis	34	36	200	50.31	PEAD/PN10	24	5.55	0.98	205.3	205.02	0.28	---	---	---	---
98bis	36	37	160	33	PEAD/PN10	8	2.31	0.51	205.02		0.08	---	---	---	---
98bis	36	37	140	9.62	PEAD/PN10	8	4.72	0.67	204.95	204.9	0.05	204.9	184.9	20	---
98bis	36	38	200	74	PEAD/PN10	24	5.55	0.98	205.02		0.41	---	---	---	---
98bis	36	38	160	27.34	PEAD/PN10	24	20.81	1.54	204.61	204.04	0.57	---	---	---	---
98bis	38	39	125	62.84	PEAD/PN10	8	8.67	0.84	204.04	203.5	0.54	203.5	183.5	20	0
98bis	38	40	160	62.59	PEAD/PN10	24	20.81	1.54	204.04	202.74	1.3	---	---	---	---
98bis	40	41	110	83.31	PEAD/PN10	8	17.42	1.09	202.74	201.29	1.45	200.6	180.6	20.69	0.69
98bis	40	42	160	25.65	PEAD/PN10	24	20.81	1.54	202.74	202.21	0.53	---	---	---	---
98bis	42	43	110	122.52	PEAD/PN10	8	17.42	1.09	202.21	200.07	2.13	197.2	177.2	22.87	2.87
98bis	42	44	160	106.16	PEAD/PN10	24	20.81	1.54	202.21	200	2.21	---	---	---	---
98bis	44	45	110	88.15	PEAD/PN10	8	17.42	1.09	200	198.46	1.54	197.2	177.2	21.26	1.26
98bis	44	46	160	67.14	PEAD/PN10	24	20.81	1.54	200	198.6	1.4	---	---	---	---
98bis	46	47	110	76.83	PEAD/PN10	8	17.42	1.09	198.6	197.26	1.34	195.2	175.2	22.06	2.06
98bis	46	48	160	15.68	PEAD/PN10	24	20.81	1.54	198.6	198.27	0.33	---	---	---	---
98bis	48	49	110	53.56	PEAD/PN10	8	17.42	1.09	198.27	197.34	0.93	195.5	175.5	21.84	1.84
98bis	48	50	160	87.11	PEAD/PN10	24	20.81	1.54	198.27	196.46	1.81	---	---	---	---
98bis	50	51	110	60.53	PEAD/PN10	8	17.42	1.09	196.46	195.41	1.05	193	173	22.41	2.41
98bis	50	52	160	37.26	PEAD/PN10	24	20.81	1.54	196.46	195.69	0.78	---	---	---	---
98bis	52	53	110	53.11	PEAD/PN10	8	17.42	1.09	195.69	194.76	0.93	192	172	22.76	2.76
98bis	52	54	160	55.25	PEAD/PN10	16	9.25	1.02	195.69	195.18	0.51	---	---	---	---
98bis	54	55	125	123	PEAD/PN10	8	8.66	0.84	195.18		1.06	---	---	---	---
98bis	54	55	110	6.38	PEAD/PN10	8	17.83	1.09	194.11	194	0.11	194	169	25	---
98bis	54	56	110	109.67	PEAD/PN10	8	17.42	1.09	195.18	193.27	1.91	192	172	21.27	1.27
98bis	7	57	250	10	PEAD/PN10	24	1.68	0.62	206.41	0.02		---	---	---	---
98bis	7	57	200	142.17	PEAD/PN10	24	5.55	0.98	206.39	205.6	0.79	---	---	---	---
98bis	57	58	200	45	PEAD/PN10	16	2.47	0.66	205.6		0.11	---	---	---	---
98bis	57	58	160	26.93	PEAD/PN10	16	9.25	1.02	205.49	205.24	0.25	---	---	---	---
98bis	58	59	160	105.65	PEAD/PN10	8	2.31	0.51	205.24	205	0.24	205	191.8	13.2	0
98bis	57	60	200	80.39	PEAD/PN10	24	5.55	0.98	205.6	205.16	0.45	---	---	---	---

Consorzio di Bonifica n.2 - Palermo

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98bis	60	61	160	67.67	PEAD/PN10	8	2.31	0.51	205.16	205	0.16	205	186.5	18.5	0
98bis	60	62	200	129.79	PEAD/PN10	24	5.55	0.98	205.16	204.44	0.72	---	---	---	---
98bis	62	63	110	39.75	PEAD/PN10	8	17.42	1.09	204.44	203.74	0.69	199.4	179.4	24.34	4.34
98bis	62	64	200	52	PEAD/PN10	24	5.5	0.98	204.44	---	0.29	---	---	---	---
98bis	62	64	160	60.3	PEAD/PN10	24	20.96	1.54	204.15	202.89	1.26	---	---	---	---
98bis	64	65	110	24.92	PEAD/PN10	8	17.42	1.09	202.89	202.45	0.43	196.7	176.7	25.75	5.75
98bis	64	66	160	194.33	PEAD/PN10	24	20.81	1.54	202.89	198.84	4.04	---	---	---	---
98bis	66	67	110	54.1	PEAD/PN10	8	17.42	1.09	198.84	197.9	0.94	192.6	172.6	25.3	5.3
98bis	66	68	160	39.47	PEAD/PN10	24	20.81	1.54	198.84	198.02	0.82	---	---	---	---
98bis	68	69	125	25.65	PEAD/PN10	8	8.67	0.84	198.02	197.8	0.22	197.8	177.8	20	0
98bis	68	70	140	78	PEAD/PN10	16	18.88	1.34	198.02	---	1.47	---	---	---	---
98bis	68	70	125	22.12	PEAD/PN10	16	34.67	1.68	196.55	195.78	0.77	---	---	---	---
98bis	70	71	110	52.59	PEAD/PN10	8	17.42	1.09	195.78	194.87	0.92	190.5	170.5	24.37	4.37
98bis	70	72	110	234.66	PEAD/PN10	8	17.42	1.09	195.78	191.7	4.09	191.7	166.7	25	0
99	5	73	250	2	PEAD/PN10	24	1.68	0.62	205.7	205.69	0	---	---	---	---
99	73	74	250	45.5	PEAD/PN10	24	1.68	0.62	205.69	205.62	0.08	---	---	---	---
99	74	75	110	13.8	PEAD/PN10	8	17.42	1.09	205.62	205.38	0.24	205	187.8	17.58	0.38
99	74	76	250	38.9	PEAD/PN10	24	1.68	0.62	205.62	205.55	0.07	---	---	---	---
99	76	77	160	101.38	PEAD/PN10	24	20.81	1.54	205.55	203.44	2.11	---	---	---	---
99	77	78	110	88.52	PEAD/PN10	8	17.42	1.09	203.44	201.9	1.54	199	179	22.9	2.9
99	77	79	160	88.12	PEAD/PN10	24	20.81	1.54	203.44	201.61	1.83	---	---	---	---
99	79	80	110	94.15	PEAD/PN10	8	17.42	1.09	201.61	199.97	1.64	195.3	175.3	24.67	4.67
99	79	81	160	93.68	PEAD/PN10	24	20.81	1.54	201.61	199.66	1.95	---	---	---	---
99	81	82	110	64.1	PEAD/PN10	8	17.42	1.09	199.66	198.54	1.12	191.2	171.2	27.34	7.34
99	81	83	125	114.24	PEAD/PN10	16	34.67	1.68	199.66	195.7	3.96	---	---	---	---
99	83	84	110	34.85	PEAD/PN10	8	17.42	1.09	195.7	195.09	0.61	192	167	28.09	3.09
99	83	85	110	98.44	PEAD/PN10	8	17.42	1.09	195.7	193.98	1.71	182.2	157.2	36.78	11.78
99	76	86	110	81.44	PEAD/PN10	8	17.42	1.09	205.55	204.13	1.42	204	184	20.13	0.13
99	76	87	250	52.27	PEAD/PN10	24	1.68	0.62	205.55	205.46	0.09	---	---	---	---
99	87	88	160	13	PEAD/PN10	8	2.31	0.51	205.46	---	0.03	---	---	---	---
99	87	88	140	91.89	PEAD/PN10	8	4.72	0.67	205.43	205	0.43	205	186.1	18.9	---
99	87	89	250	50.18	PEAD/PN10	24	1.68	0.62	205.46	205.38	0.08	---	---	---	---
99	89	90	140	66	PEAD/PN10	8	4.72	0.67	205.38	---	0.31	---	---	---	---
99	89	90	125	8.04	PEAD/PN10	8	8.67	0.84	205.07	205	0.07	205	188.5	16.5	---
99	89	91	250	42.75	PEAD/PN10	24	1.68	0.62	205.38	205.31	0.07	---	---	---	---
99	91	92	160	6	PEAD/PN10	8	2.31	0.51	205.31	---	0.01	---	---	---	---
99	91	92	140	62.32	PEAD/PN10	8	4.72	0.67	205.29	205	0.29	205	189.8	15.2	---
99	91	93	200	18.74	PEAD/PN10	16	2.47	0.66	205.31	205.26	0.05	---	---	---	---
99	93	94	160	111.27	PEAD/PN10	8	2.31	0.51	205.26	205	0.26	205	196.2	8.8	0
99	93	95	160	45	PEAD/PN10	8	2.29	0.51	205.26	---	0.1	---	---	---	---
99	93	95	140	33.14	PEAD/PN10	8	4.79	0.67	205.16	205	0.16	205	194.7	10.3	---
99	74	96	200	86.7	PEAD/PN10	24	5.55	0.98	205.62	205.14	0.48	---	---	---	---
99	96	97	140	25.73	PEAD/PN10	8	4.72	0.67	205.14	205.01	0.12	205	187.3	17.71	0.01
99	96	98	200	65.95	PEAD/PN10	24	5.55	0.98	205.14	204.77	0.37	---	---	---	---
99	98	99	110	43.28	PEAD/PN10	8	17.42	1.09	204.77	204.02	0.75	203.5	183.5	20.52	0.52
99	98	100	200.0	20.7	PEAD/PN10	24	5.55	0.98	204.77	204.65	0.11	---	---	---	---
99	100	101	160.0	138.59	PEAD/PN10	24	20.81	1.54	204.65	201.77	2.88	---	---	---	---
99	101	102	110.0	174.94	PEAD/PN10	8	17.42	1.09	201.77	198.72	3.05	190	165	33.72	8.72
99	101	103	160.0	17.16	PEAD/PN10	24	20.81	1.54	201.77	201.41	0.36	---	---	---	---
99	103	104	110.0	14.54	PEAD/PN10	8	17.42	1.09	201.41	201.16	0.25	198.9	178.9	22.26	2.26
99	103	105	160.0	70.52	PEAD/PN10	24	20.81	1.54	201.41	199.95	1.47	---	---	---	---
99	105	106	110.0	12.3	PEAD/PN10	8	17.42	1.09	199.95	199.73	0.21	196.2	176.2	23.53	3.53
99	105	107	125.0	80.74	PEAD/PN10	16	34.67	1.68	199.95	197.15	2.8	---	---	---	---
99	107	108	110.0	79.99	PEAD/PN10	8	17.42	1.09	197.15	195.76	1.39	180	150	45.76	15.76
99	107	109	110.0	107.49	PEAD/PN10	8	17.42	1.09	197.15	195.28	1.87	185	160	35.28	10.28
99	100	110	200.0	60.02	PEAD/PN10	24	5.55	0.98	204.65	204.32	0.33	---	---	---	---
99	110	111	110.0	60.55	PEAD/PN10	8	17.42	1.09	204.32	203.27	1.05	201.8	181.8	21.47	1.47
99	110	112	200.0	74.04	PEAD/PN10	24	5.55	0.98	204.32	203.91	0.41	---	---	---	---
99	112	113	200.0	117.29	PEAD/PN10	24	5.55	0.98	203.91	203.26	0.65	---	---	---	---
99	113	114	200.0	57.15	PEAD/PN10	24	5.55	0.98	203.26	202.94	0.32	---	---	---	---
99	114	115	200.0	77.55	PEAD/PN10	24	5.55	0.98	202.94	202.51	0.43	---	---	---	---
99	115	116	110.0	41.89	PEAD/PN10	8	17.42	1.09	202.51	201.78	0.73	198.5	178.5	23.28	3.28
99	115	117	200.0	33	PEAD/PN10	24	5.47	0.98	202.51	---	0.18	---	---	---	---
99	115	117	160.0	70.05	PEAD/PN10	24	20.94	1.54	202.33	200.87	1.47	---	---	---	---
99	117	118	110.0	70.37	PEAD/PN10	8	17.42	1.09	200.87	199.64	1.23	197.5	177.5	22.14	2.14
99	117	119	160.0	6.75	PEAD/PN10	24	20.81	1.54	200.87	200.73	0.14	---	---	---	---
99	119	120	110.0	56.8	PEAD/PN10	8	17.42	1.09	200.73	199.74	0.99	197.9	177.9	21.84	1.84
99	119	121	160.0	70.31	PEAD/PN10	24	20.81	1.54	200.73	199.26	1.46	---	---	---	---
99	121	122	110.0	130.19	PEAD/PN10	8	17.42	1.09	199.26	197	2.27	193	173	24	4
99	121	123	110.0	104.63	PEAD/PN10	8	17.42	1.09	199.26	197.44	1.82	194	174	23.44	3.44
99	121	124	160.0	67.25	PEAD/PN10	24	20.81	1.54	199.26	197.86	1.4	---	---	---	---
99	124	125	125.0	265.34	PEAD/PN10	16	34.67	1.68	197.86	188.67	9.2	---	---	---	---
99	125	126	110.0	127.42	PEAD/PN10	8	17.42	1.09	188.67	186.45	2.22	185	160	26.45	1.45
99	124	127	160.0	93.65	PEAD/PN10	24	20.81	1.54	197.86	195.92	1.95	---	---	---	---
99	127	128	160.0	81.08	PEAD/PN10	24	20.81	1.54	195.92	194.23	1.69	---	---	---	---

Consorzio di Bonifica n.2 - Palermo

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99	128	129	110.0	38.43	PEAD/PN10	8	17.42	1.09	194.23	193.56	0.67	193.4	173.4	20.16	0.16
99	128	130	160.0	75.29	PEAD/PN10	16	9.25	1.02	194.23	193.53	0.7	---	---	---	---
99	130	131	125.0	38.31	PEAD/PN10	8	8.67	0.84	193.53	193.2	0.33	193.2	173.2	20	0
99	130	132	110.0	56.2	PEAD/PN10	8	17.42	1.09	193.53	192.55	0.98	191.5	171.5	21.05	1.05
100	6	133	200.0	2	PEAD/PN10	24	5.55	0.98	199.2	199.19	0.01	---	---	---	---
100	133	134	160.0	10.76	PEAD/PN10	24	20.81	1.54	199.19	198.97	0.22	---	---	---	---
100	134	135	160.0	122.87	PEAD/PN10	24	20.81	1.54	198.97	196.41	2.56	---	---	---	---
100	135	136	110.0	13.52	PEAD/PN10	8	17.42	1.09	196.41	196.18	0.24	193.4	168.4	27.78	2.78
100	135	137	125.0	120.62	PEAD/PN10	16	34.67	1.68	196.41	192.23	4.18	---	---	---	---
100	137	138	110.0	60.56	PEAD/PN10	8	17.42	1.09	192.23	191.18	1.05	178	148	43.18	13.18
100	133	139	200.0	54.91	PEAD/PN10	24	5.55	0.98	199.19	198.89	0.3	---	---	---	---
100	139	140	110.0	67.82	PEAD/PN10	8	17.42	1.09	198.89	197.71	1.18	192.2	167.2	30.51	5.51
100	139	141	200.0	67.44	PEAD/PN10	24	5.55	0.98	198.89	198.51	0.37	---	---	---	---
100	141	142	110.0	91.87	PEAD/PN10	8	17.42	1.09	198.51	196.91	1.6	193	168	28.91	3.91
100	141	143	200.0	37	PEAD/PN10	24	5.55	0.98	198.51	---	0.21	---	---	---	---
100	141	143	160.0	62.5	PEAD/PN10	24	20.81	1.54	198.31	197.01	1.3	---	---	---	---
100	143	144	160.0	23.3	PEAD/PN10	24	20.81	1.54	197.01	196.52	0.48	---	---	---	---
100	144	145	160.0	110.86	PEAD/PN10	24	20.81	1.54	196.52	194.22	2.31	---	---	---	---
100	145	146	110.0	92.03	PEAD/PN10	8	17.42	1.09	194.22	192.61	1.6	187.1	162.1	30.51	5.51
100	145	147	160.0	81.13	PEAD/PN10	24	20.81	1.54	194.22	192.53	1.69	---	---	---	---
100	147	148	110.0	45.6	PEAD/PN10	8	17.42	1.09	192.53	191.73	0.79	184	159	32.73	7.73
100	147	149	110.0	16.95	PEAD/PN10	8	17.42	1.09	192.53	192.23	0.3	185.5	160.5	31.73	6.73
100	147	150	160.0	38.02	PEAD/PN10	24	20.81	1.54	192.53	191.74	0.79	---	---	---	---
100	150	151	110.0	74.85	PEAD/PN10	8	17.42	1.09	191.74	190.43	1.3	183.8	158.8	31.63	6.63
100	150	152	160.0	64	PEAD/PN10	24	20.81	1.54	191.74	190.41	1.33	---	---	---	---
100	152	153	110.0	63.34	PEAD/PN10	8	17.42	1.09	190.41	189.3	1.1	180.8	155.8	33.5	8.5
100	152	154	160.0	58.87	PEAD/PN10	24	20.81	1.54	190.41	189.18	1.22	---	---	---	---
100	154	155	110.0	42.68	PEAD/PN10	8	17.42	1.09	189.18	188.44	0.74	181.5	156.5	31.94	6.94
100	154	156	125.0	17.8	PEAD/PN10	16	34.67	1.68	189.18	188.56	0.62	---	---	---	---
100	156	157	110.0	74.75	PEAD/PN10	8	17.42	1.09	188.56	187.26	1.3	178.6	153.6	33.66	8.66
100	156	158	110.0	63.39	PEAD/PN10	8	17.42	1.09	188.56	187.46	1.1	178.5	153.5	33.96	8.96
100	143	159	160.0	44.61	PEAD/PN10	24	20.81	1.54	197.01	196.08	0.93	---	---	---	---
100	159	160	110.0	46.21	PEAD/PN10	8	17.42	1.09	196.08	195.28	0.8	188.5	163.5	31.78	6.78
100	159	161	160.0	78.66	PEAD/PN10	24	20.81	1.54	196.08	194.44	1.64	---	---	---	---
100	161	162	110.0	54.57	PEAD/PN10	8	17.42	1.09	194.44	193.49	0.95	188.5	163.5	29.99	4.99
100	161	163	160.0	90.23	PEAD/PN10	24	20.81	1.54	194.44	192.57	1.88	---	---	---	---
100	163	164	160.0	99.85	PEAD/PN10	24	20.81	1.54	192.57	190.49	2.08	---	---	---	---
100	164	165	110.0	12.16	PEAD/PN10	8	17.42	1.09	190.49	190.28	0.21	187.5	162.5	27.78	2.78
100	164	166	125.0	77.18	PEAD/PN10	16	34.67	1.68	190.49	187.81	2.68	---	---	---	---
100	166	167	110.0	16.85	PEAD/PN10	8	17.42	1.09	187.81	187.52	0.29	184	159	28.52	3.52
100	166	168	110.0	97.65	PEAD/PN10	8	17.42	1.09	187.81	186.11	1.7	182.5	157.5	28.61	3.61
100	163	169	160.0	52.98	PEAD/PN10	24	20.81	1.54	192.57	191.46	1.1	---	---	---	---
100	169	170	110.0	40.12	PEAD/PN10	8	17.42	1.09	191.46	190.76	0.7	187	162	28.76	3.76
100	169	171	160.0	52.14	PEAD/PN10	24	20.81	1.54	191.46	190.38	1.08	---	---	---	---
100	171	172	110.0	92.46	PEAD/PN10	8	17.42	1.09	190.38	188.77	1.61	185	160	28.77	3.77
100	171	173	160.0	40.01	PEAD/PN10	24	20.81	1.54	190.38	189.55	0.83	---	---	---	---
100	173	174	110.0	35.01	PEAD/PN10	8	17.42	1.09	189.55	188.94	0.61	184.1	159.1	29.84	4.84
100	173	175	160.0	142.77	PEAD/PN10	24	20.81	1.54	189.55	186.58	2.97	---	---	---	---
100	175	176	125.0	11.86	PEAD/PN10	16	34.67	1.68	186.58	186.16	0.41	---	---	---	---
100	176	177	110.0	99.95	PEAD/PN10	8	17.42	1.09	186.16	184.42	1.74	180.5	155.5	28.92	3.92
100	176	178	110.0	128.87	PEAD/PN10	8	17.42	1.09	186.16	183.92	2.24	179.2	154.2	29.72	4.72
100	175	179	160.0	76.03	PEAD/PN10	24	20.81	1.54	186.58	184.99	1.58	---	---	---	---
100	179	180	125.0	50.78	PEAD/PN10	16	34.67	1.68	184.99	183.23	1.76	---	---	---	---
100	180	181	110.0	80.94	PEAD/PN10	8	17.42	1.09	183.23	181.82	1.41	177	152	29.82	4.82
100	180	182	110.0	214.81	PEAD/PN10	8	17.42	1.09	183.23	179.49	3.74	179.5	149.5	29.99	-0.01
100	133	183	160.0	59.41	PEAD/PN10	24	20.81	1.54	199.19	197.96	1.24	---	---	---	---
100	183	184	110.0	69.33	PEAD/PN10	8	17.42	1.09	197.96	196.75	1.21	194.3	169.3	27.45	2.45
100	183	185	160.0	141.11	PEAD/PN10	24	20.81	1.54	197.96	195.02	2.94	---	---	---	---
100	185	186	110.0	47.11	PEAD/PN10	8	17.42	1.09	195.02	194.2	0.82	192.5	167.5	26.7	1.7
100	185	187	160.0	59.25	PEAD/PN10	24	20.81	1.54	195.02	193.79	1.23	---	---	---	---
100	187	188	125.0	22	PEAD/PN10	8	8.67	0.84	193.79	0.19	---	---	---	---	---
100	187	188	110.0	28.66	PEAD/PN10	8	17.42	1.09	193.6	193.1	0.5	193.1	168.1	25	---
100	187	189	125.0	19.65	PEAD/PN10	16	34.67	1.68	193.79	193.11	0.68	---	---	---	---
100	189	190	110.0	69.24	PEAD/PN10	8	17.42	1.09	193.11	191.9	1.21	190	165	26.9	1.9
100	189	191	110.0	101.9	PEAD/PN10	8	17.42	1.09	193.11	191.33	1.77	187.8	162.8	28.53	3.53
100	144	192	110.0	11.51	PEAD/PN10	8	17.42	1.09	196.52	196.32	0.2	189.4	164.4	31.92	6.92
101	4	193	200.0	2	PEAD/PN10	24	5.55	0.98	199.54	199.52	0.01	---	---	---	---
101	193	194	160.0	69.35	PEAD/PN10	24	20.81	1.54	199.52	198.08	1.44	---	---	---	---
101	194	195	110.0	10.44	PEAD/PN10	8	17.42	1.09	198.08	197.9	0.18	193.3	168.3	29.6	4.6
101	185	196	140.0	82	PEAD/PN10	16	18.88	1.34	195.02	1.55	---	---	---	---	---
101	185	196	125.0	39.62	PEAD/PN10	16	34.67	1.68	193.47	192.1	1.37	---	---	---	---
101	196	197	110.0	103.41	PEAD/PN10	8	17.42	1.09	192.1	190.3	1.8	190.3	165.3	25	0
101	194	198	160.0	24.95	PEAD/PN10	24	20.81	1.54	198.08	197.56	0.52	---	---	---	---
101	198	199	110.0	54.12	PEAD/PN10	8	17.42	1.09	197.56	196.62	0.94	191.8	166.8	29.82	4.82
101	198	200	160.0	68.5	PEAD/PN10	24	20.81	1.54	197.56	196.14	1.43	---	---	---	---

Consorzio di Bonifica n.2 - Palermo

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101	200	201	110.0	58.31	PEAD/PN10	8	17.42	1.09	196.14	195.12	1.02	190	165	30.12	5.12
101	200	202	160.0	44.3	PEAD/PN10	24	20.81	1.54	196.14	195.22	0.92	---	---	---	---
101	202	203	110.0	95.17	PEAD/PN10	8	17.42	1.09	195.22	193.56	1.66	186	161	32.56	7.56
101	202	204	110.0	107.41	PEAD/PN10	8	17.42	1.09	195.22	193.34	1.87	187.5	162.5	30.84	5.84
101	202	205	160.0	85.92	PEAD/PN10	24	20.81	1.54	195.22	193.43	1.79	---	---	---	---
101	205	206	110.0	113.61	PEAD/PN10	8	17.42	1.09	193.43	191.45	1.98	186.1	161.1	30.35	5.35
101	205	207	160.0	24.19	PEAD/PN10	24	20.81	1.54	193.43	192.92	0.5	---	---	---	---
101	207	208	110.0	14.34	PEAD/PN10	8	17.42	1.09	192.92	192.68	0.25	187.5	162.5	30.18	5.18
101	207	209	160.0	14.43	PEAD/PN10	24	20.81	1.54	192.92	192.62	0.3	---	---	---	---
101	209	210	125.0	64.44	PEAD/PN10	16	34.67	1.68	192.62	190.39	2.23	---	---	---	---
101	210	211	110.0	71.88	PEAD/PN10	8	17.42	1.09	190.39	189.14	1.25	184.5	159.5	29.64	4.64
101	210	212	110.0	64.52	PEAD/PN10	8	17.42	1.09	190.39	189.27	1.12	184	159	30.27	5.27
101	209	213	160.0	53.25	PEAD/PN10	24	20.81	1.54	192.62	191.52	1.11	---	---	---	---
101	213	214	110.0	99.15	PEAD/PN10	8	17.42	1.09	191.52	189.79	1.73	183.5	158.5	31.29	6.29
101	213	215	160.0	51.43	PEAD/PN10	24	20.81	1.54	191.52	190.45	1.07	---	---	---	---
101	215	216	110.0	45.08	PEAD/PN10	8	17.42	1.09	190.45	189.66	0.79	184.8	159.8	29.86	4.86
101	215	217	160.0	34.46	PEAD/PN10	24	20.81	1.54	190.45	189.73	0.72	---	---	---	---
101	217	218	125.0	45.02	PEAD/PN10	16	34.67	1.68	189.73	188.17	1.56	---	---	---	---
101	218	219	110.0	87.34	PEAD/PN10	8	17.42	1.09	188.17	186.65	1.52	180	155	31.65	6.65
101	217	220	125.0	79.11	PEAD/PN10	16	34.67	1.68	189.73	186.99	2.74	---	---	---	---
101	220	221	110.0	40.53	PEAD/PN10	8	17.42	1.09	186.99	186.28	0.71	180.5	155.5	30.78	5.78
101	220	222	110.0	70.35	PEAD/PN10	8	17.42	1.09	186.99	185.76	1.23	179.5	154.5	31.26	6.26
101	217	223	160.0	48.22	PEAD/PN10	24	20.81	1.54	189.73	188.73	1	---	---	---	---
101	223	224	110.0	62.83	PEAD/PN10	8	17.42	1.09	188.73	187.63	1.09	180.2	155.2	32.43	7.43
101	223	225	125.0	72.34	PEAD/PN10	16	34.67	1.68	188.73	186.22	2.51	---	---	---	---
101	225	226	110.0	86.53	PEAD/PN10	8	17.42	1.09	186.22	184.71	1.51	177.5	152.5	32.21	7.21
101	225	227	110.0	168.3	PEAD/PN10	8	17.42	1.09	186.22	183.29	2.93	176.8	151.8	31.49	6.49
101	193	228	200.0	40.89	PEAD/PN10	24	5.55	0.98	199.52	199.3	0.23	---	---	---	---
101	228	229	160.0	115.2	PEAD/PN10	24	20.81	1.54	199.3	196.9	2.4	---	---	---	---
101	229	230	110.0	54.25	PEAD/PN10	8	17.42	1.09	196.9	195.96	0.94	191.1	166.1	29.86	4.86
101	229	231	160.0	159.47	PEAD/PN10	24	20.81	1.54	196.9	193.58	3.32	---	---	---	---
101	231	232	110.0	27.59	PEAD/PN10	8	17.42	1.09	193.58	193.1	0.48	190.7	165.7	27.4	2.4
101	231	233	160.0	131.65	PEAD/PN10	24	20.81	1.54	193.58	190.84	2.74	---	---	---	---
101	233	234	110.0	81	PEAD/PN10	8	17.42	1.09	190.84	189.43	1.41	188.2	163.2	26.23	1.23
101	233	235	160.0	38.23	PEAD/PN10	24	20.81	1.54	190.84	190.05	0.8	---	---	---	---
101	235	236	160.0	122.33	PEAD/PN10	24	20.81	1.54	190.05	187.5	2.55	---	---	---	---
101	236	237	110.0	109.78	PEAD/PN10	8	17.42	1.09	187.5	185.59	1.91	184.5	159.5	26.09	1.09
101	236	238	160.0	127.18	PEAD/PN10	24	20.81	1.54	187.5	184.86	2.65	---	---	---	---
101	238	239	110.0	86.7	PEAD/PN10	8	17.42	1.09	184.86	183.35	1.51	180.3	155.3	28.05	3.05
101	238	240	160.0	33.21	PEAD/PN10	24	20.81	1.54	184.86	184.17	0.69	---	---	---	---
101	240	241	110.0	60.11	PEAD/PN10	8	17.42	1.09	184.17	183.12	1.05	179	154	29.12	4.12
101	240	242	160.0	121.17	PEAD/PN10	24	20.81	1.54	184.17	181.65	2.52	---	---	---	---
101	242	243	110.0	8.39	PEAD/PN10	8	17.42	1.09	181.65	181.5	0.15	181	156	25.5	0.5
101	242	244	160.0	38.1	PEAD/PN10	24	20.81	1.54	181.65	180.85	0.79	---	---	---	---
101	244	245	110.0	142.6	PEAD/PN10	8	17.42	1.09	180.85	178.37	2.48	175	150	28.37	3.37
101	244	246	160.0	50.81	PEAD/PN10	24	20.81	1.54	180.85	179.8	1.06	---	---	---	---
101	246	247	160.0	8	PEAD/PN10	16	8.78	1.02	179.8		0.07				
101	246	247	140.0	66.66	PEAD/PN10	16	19	1.34	179.73	178.46	1.27	---	---	---	
101	247	248	125.0	110.66	PEAD/PN10	8	8.67	0.84	178.46	177.5	0.96	177.5	152.5	25	0
101	246	249	110.0	68.29	PEAD/PN10	8	17.42	1.09	179.8	178.61	1.19	176	151	27.61	2.61

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Relazione dei calcoli idraulici

APPENDICE C

ANALISI DELLE SOVRAPPRESSIONI DOVUTE AI MOTI TRANSITORI IN OCCASIONE DI RAPIDE MANOVRE DI CHIUSURA

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1. SCOPO E CONTENUTO

La presente relazione si prefigge lo scopo di verificare le sovrappressioni massime che si realizzano nella rete irrigua a seguito di manovre sugli organi di sezionamento posti a monte dei gruppi di consegna comiziali. In essa vengono illustrati i criteri adottati, le ipotesi formulate e descritti sinteticamente i risultati raggiunti.

2. DATI DI INGRESSO

Le presenti verifiche sono state eseguite con riferimento a:

- Schema plani-altimetrico (vedi Fig. 1 –Schema planimetrico rete irrigua) della rete di progetto. Per ogni tronco della rete sono note le relative caratteristiche idrauliche (lunghezza, diametro, materiale tubazione, portata di esercizio ordinario);
- Caratteristiche idrauliche delle valvole di sezionamento (curve Q-DH).

2.1 Schema della rete idraulica

La schematizzazione del sistema idraulico di progetto è stata eseguita sulla scorta dei risultati della ottimizzazione economico-idraulica.

Dal punto di vista dell'esercizio la rete è di tipo “turnato”, pertanto le manovre di regolazione saranno eseguite esclusivamente da personale addetto dell'Amministrazione senza che l'utente possa intervenire. Le manovre saranno concentrate sui gruppi comiziali e rappresentano quindi le condizioni più gravose per la rete. Tale tipo di esercizio esclude pertanto la possibilità di contemporaneità delle manovre sui diversi gruppi.

Il sistema idraulico è costituito da una rete di distribuzione di tipo aperto, facente capo alla vasca di compenso C.da Baronìa. Da questa si diparte una lunga adduttrice/ripartitrice con diametri variabili da 1000 a 600 mm. Lungo il percorso si diramano 9 ripartitrici di vario diametro realizzate in PEAD.

Questa rete è stata schematizzata nel modello di calcolo inserendo per ciascun tronco:

- Il nodo idraulico iniziale con la quota asse tubo;
- Il nodo idraulico finale con la quota asse tubo;
- La lunghezza (m);
- Il diametro (mm);
- Il materiale della tubazione;
- Il coeff. di scabrezza (Hazen-Williams);

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3. IPOTESI DI LAVORO

Dall'esame della rete e dalle modalità di esercizio previste si sono ipotizzate una serie di manovre di chiusura delle valvole di sezionamento del gruppo di consegna comiziali, posti nei punti idraulicamente più sfavoriti al fine di massimizzare la produzione di sovrappressioni.

In particolare si sono ipotizzate le seguenti manovre:

- Caso “A”: chiusura della valvola di sezionamento del G.C. n. 74, posto sulla ripartitrice C1; la manovra di chiusura completa viene realizzata in 50 sec.;
- Caso “B”: chiusura della valvola di sezionamento del G.C. n. 100, posto sulla ripartitrice I1-I3 la manovra di chiusura completa viene realizzata in 30 sec.

I diversi tempi di chiusura hanno lo scopo di verificare la sensibilità del sistema a questo parametro.

Entrambe le manovre sono state modellate a partire dalle condizioni di esercizio irriguo massimo corrispondente al deflusso delle massime portate in rete.

4. METODO DI CALCOLO TEORIA

4.1 Transitori idraulici: generalità

I fenomeni transitori che si verificano nelle reti idrauliche in pressione possono ricondursi a due categorie fondamentali:

- oscillazioni di moto vario elastico;
- oscillazioni di massa.

I fenomeni della prima categoria consistono nella propagazione nel circuito di onde di pressione che si muovono con elevata velocità (celerità) per effetto della comprimibilità del fluido e dell'elasticità della condotta.

Le oscillazioni di massa consistono invece in spostamenti della colonna liquida contenuta nella condotta.

4.2 Equazioni fondamentali

4.2.1 Generalità

L'analisi del moto di una corrente fluida viene svolta in termini quantitativi attraverso le due equazioni ricorrenti nello studio dei fenomeni idraulici:

- equazione di continuità, che fa riferimento al principio della conservazione della massa;

- equazione del moto, che fa riferimento al principio di conservazione dell'energia.

4.2.2 Equazione di continuità

L'equazione di continuità esprime il principio della conservazione della massa fluida contenuta nella condotta mediante l'eguaglianza tra la variazione nel tempo della massa in un tratto di condotta e la differenza tra portata entrante e portata uscente nello stesso tratto.

In termini generali tale condizione viene espressa come:

$$\frac{\partial M}{\partial t} = Q_e - Q_u \quad [1]$$

dove:

M = massa

t = tempo

Q_e = portata (in massa) entrante

Q_u = portata (in massa) uscente

Per l'applicazione al problema del moto vario, l'equazione generale sopra riportata deve essere esplicitata previa l'adozione delle seguenti ipotesi riguardanti il comportamento elastico del fluido e della condotta.:

- la densità del fluido vari in funzione della sola pressione (comportamento barotropico);
- la condotta sia linearmente elastica (applicabilità dell'espressione di Mariotte alle variazioni della sezione in funzione della pressione).

Sotto queste ipotesi l'equazione di continuità diventa:

$$\frac{\partial H}{\partial t} + v \frac{\partial H}{\partial x} + \frac{a^2}{g} \frac{\partial v}{\partial x} = 0 \quad [2]$$

dove:

H = carico piezometrico

x = ascissa lungo la condotta

a = celerità di propagazione

g = accelerazione di gravità

v = velocità del fluido

Il secondo termine al primo membro dell'espressione è piccolo rispetto agli altri termini e viene tipicamente trascurato, cosicché si ha la seguente equazione di continuità semplificata, impiegata nella gran parte dei modelli di moto vario elastico:

$$\frac{\partial H}{\partial t} + \frac{a^2}{g} \frac{\partial v}{\partial x} = 0 \quad [3]$$

4.2.3 Equazione del moto

L'equazione del moto esprime il principio della conservazione dell'energia mediante l'eguaglianza tra la variazione nel tempo della quantità di moto di un elemento di fluido e la somma delle forze esterne agenti su di esso.

In termini generali tale condizione viene espressa come:

$$\frac{\partial(M v)}{\partial t} = \Sigma(F_e) \quad [4]$$

dove: F_e = forze esterne

Particolarizzando le equazioni generali relative al caso tridimensionale (equazioni di Navier-Stokes) per il caso monodimensionale di interesse per le condotte (nel quale il moto si svolge prevalentemente secondo l'asse della stessa), e tenendo conto delle diverse forze:

- pressione tra elementi contigui di fluido;
- gravità;
- resistenze al moto;

si perviene all'espressione:

$$\frac{\partial v}{\partial t} + v \frac{\partial v}{\partial x} + g \frac{\partial H}{\partial x} + \frac{f v |v|}{2 D} = 0 \quad [5]$$

dove:

f = fattore di resistenza secondo Darcy-Weisbach

D = diametro interno della condotta (o dimensione equivalente)

Il secondo termine al primo membro, che rappresenta l'accelerazione convettiva, proporzionale alla variazione spaziale della velocità in un punto del fluido, viene generalmente trascurato, cosicché l'equazione del moto semplificata diventa:

$$\frac{\partial v}{\partial t} + g \frac{\partial H}{\partial x} + \frac{f v |v|}{2 D} = 0 \quad [6]$$

4.3 Sintesi delle ipotesi semplificative

Per completezza dell'inquadramento, si ritiene utile segnalare che le equazioni [3] e [6], sebbene rigorose ed esplicite, sottintendono le seguenti ipotesi, non sempre strettamente valide nei sistemi reali:

- omogeneità del fluido: l'acqua tipicamente contiene piccole quantità di aria disciolta o intrappolata, il cui tenore varia lungo la condotta;
- comportamento elastico lineare della condotta: nelle condotte la cui sezione presenti ovalizzazioni importanti, le deformazioni possono essere non interamente recuperate;
- comportamento elastico lineare del fluido: nelle condotte in cui l'integrità sia compromessa così da dar luogo a perdite, il fluido può disperdersi fuori del sistema invece di comprimersi;
- monodimensionalità del flusso: tale assunzione diverge dal comportamento reale in corrispondenza di diramazioni, dove hanno luogo perdite concentrate dovute a turbolenze tridimensionali;
- riempimento completo della condotta: anche nei sistemi in pressione possono verificarsi locali accumuli di aria o vapore in corrispondenza di vertici positivi della livelletta: ciò si traduce in un'accelerazione locale del flusso dovuta al restringimento della sezione;
- adozione di un valore medio della velocità: è stato sperimentalmente dimostrato che in una sezione trasversale la distribuzione delle velocità varia durante il transitorio anche in tratti rettilinei di condotta;
- uguaglianza delle perdite viscosse in regime transitorio a quelle in regime permanente: la ricerca sperimentale non conferma la validità di questa assunzione.

Tuttavia le assunzioni sopraelencate sono sostanzialmente valide nella gran parte dei sistemi idraulici, e la soluzione delle equazioni nella forma indicata fornisce risultati sufficientemente accurati.

4.4 METODO DELLE CARATTERISTICHE

In linea di principio le equazioni [3] e [6] potrebbero essere risolte analiticamente così da determinare carico totale e portata in ogni istante in ogni punto del sistema.

Tuttavia l'attrito e le condizioni al contorno non lineari rendono impossibile pervenire ad una soluzione esatta.

D'altra parte, se si ricorresse semplicemente alla trasformazione delle derivate totali e parziali in differenze finite si incorrerebbe in problemi di instabilità numerica; inoltre le condizioni al contorno sono difficili da soddisfare.

Se invece si trasformano le derivate parziali in derivate totali, le equazioni che ne risultano sono più facili da risolvere e conducono a soluzioni numericamente stabili. Su tale trasformazione, basata sulla trattazione di Massau (1900) si basa appunto il cosiddetto “metodo delle caratteristiche”.

Esso costituisce attualmente il metodo di calcolo più ampiamente utilizzato e collaudato per la risoluzione delle equazioni [3] e [6] ai fini delle analisi di moto vario elastico nei sistemi idraulici in pressione; il codice di calcolo a cui si è fatto ricorso impiega appunto tale metodo.

Secondo tale impostazione, il sistema costituito dalle equazioni [3] e [6] viene trasformato nel sistema equivalente di quattro equazioni:

$$\frac{g}{a} \frac{dH}{dt} + \frac{dv}{dt} + \frac{f v |v|}{2 D} = 0 \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} C^+ \quad [7]$$

$$\frac{dx}{dt} = +a \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} \quad [8]$$

$$\frac{g}{a} \frac{dH}{dt} + \frac{dv}{dt} + \frac{f v |v|}{2 D} = 0 \quad \left. \begin{array}{l} \\ \end{array} \right\} C^+ \quad [9]$$

$$\frac{dx}{dt} = -a \quad \left. \begin{array}{l} \\ \end{array} \right\} C^- \quad [10]$$

dove le equazioni [7] e [9] definiscono le curve dette caratteristiche e le corrispondenti [8] e [10] sono denominate equazioni di compatibilità.

Le curve caratteristiche, che possono essere espresse graficamente in un piano spazio-tempo, rappresentano i segnali che si propagano simultaneamente lungo l'ascissa positiva (C^+) e negativa (C^-) da ogni punto del sistema; lungo di esse si muove un osservatore che procede con velocità $(v+a)$ e $(v-a)$ rispettivamente per la caratteristica positiva C^+ e negativa C^- .

La soluzione del sistema di equazioni così definito risulta più agevole rispetto a quella del sistema originario da cui deriva (equazioni [3] e [6]); essa viene ottenuta attraverso l'integrazione alle differenze finite, a partire dalle condizioni del sistema idraulico al tempo iniziale, per il quale devono essere note, in ogni punto, le grandezze H e v , nonché i valori della celerità a .

Nella generalità dei casi queste grandezze sono note nelle condizioni di moto permanente che precedono l'inizio della fase di moto vario.

Devono essere inoltre note, per tutti i valori di tempo t tra l'istante iniziale e quello di esaurimento del transitorio, le condizioni al contorno, cioè le relazioni tra le grandezze H , v in tutte le sezioni caratteristiche del sistema: punto iniziale, punto finale, nonché tutti i punti singolari (in corrispondenza di apparecchiature e dispositivi idraulici quali valvole, sfiati, casse d'aria, pompe,).

4.5 CARATTERIZZAZIONE DEL SISTEMA IDRAULICO

4.5.1 Celerità ed elasticità delle condotte

L'elasticità di un qualsiasi elemento è caratterizzata dalla deformazione dello stesso in conseguenza dell'applicazione di una forza.

Pertanto, se una massa di fluido di volume V è soggetta ad un aumento di pressione statica dp , nel fluido si verifica una corrispondente riduzione di volume dV (<0), il fattore di proporzionalità tra deformazione e forza essendo il modulo di compressibilità volumetrico ε :

$$\varepsilon = \frac{dp}{\frac{dV}{V}} = \frac{dp}{\frac{d\rho}{\rho}}$$

dove:

dp = variazione di pressione statica

$\frac{dV}{V}$ = variazione di volume rispetto al volume iniziale

$\frac{d\rho}{\rho}$ = variazione di densità rispetto alla densità iniziale

La celerità dell'onda elastica c in un fluido non confinato (che rappresenta la velocità con cui un disturbo si propaga attraverso il fluido) è fornita dalla seguente relazione tra il modulo di compressibilità del fluido e la sua densità:

$$c = \sqrt{\frac{\varepsilon}{\rho}} = \sqrt{\frac{dp}{d\rho}}$$

Per l'acqua essa vale approssimativamente 1420 m/s.

L'espressione della celerità a in una condotta deriva dalla correzione del valore c mediante un fattore che tiene conto delle caratteristiche meccaniche della condotta stessa:

$$a = \sqrt{\frac{c}{1 + \frac{\varepsilon D}{E s} \psi}}$$

dove:

D = diametro interno della condotta

E = modulo di elasticità del materiale costituente la condotta

s = spessore della condotta

ψ = costante dipendente dalle condizioni di vincolo della condotta = $1-\nu^2$

con:

ν = coefficiente di Poisson del materiale costituente la condotta

4.5.2 Propagazione dell'onda di pressione e durata della fase

L'onda di pressione generata da una manovra su una linea idraulica di lunghezza L si propaga con una velocità a , e raggiunge l'estremità della linea in un intervallo di tempo L/a .

Lo stesso intervallo di tempo è necessario perché l'onda riflessa percorra a ritroso la linea raggiungendo l'origine.

L'intervallo di tempo totale:

$$T = 2 L/a$$

costituisce la durata della fase (o “ritmo” o “tempo caratteristico” della linea).

In relazione al valore assunto da questa grandezza, le manovre di durata t_m vengono classificate come:

- istantanee: $t_m = 0$
- rapide: $t_m \leq T$
- graduali: $t_m > T$
- lente: $t_m \gg T$

Nell'analisi dei transitori la durata della fase è significativa in quanto dal suo valore dipende il modello da applicare: il modello rigido fornisce risultati accurati solo nel caso di manovre lente (che non determinano significative compressioni del fluido o deformazioni della condotta), mentre nel caso di manovre istantanee, rapide o graduali occorre applicare il modello elastico.

5. CALCOLAZIONI ESEGUITE E DESCRIZIONE DEI RISULTATI

I risultati delle calcolazioni eseguite sono sintetizzati nelle tabelle e nelle figure seguenti.

Dall'esame dei risultati si deduce che le manovre di chiusura totale ipotizzate producono delle sovrappressioni dell'ordine di 10 m rispetto alle piezometriche di esercizio. Tali valori interessano principalmente i tratti di tubazione subito a monte della valvola in manovra e si

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riducono rapidamente per effetto delle riflessioni d'onda in corrispondenza dei nodi idraulici della rete di monte.

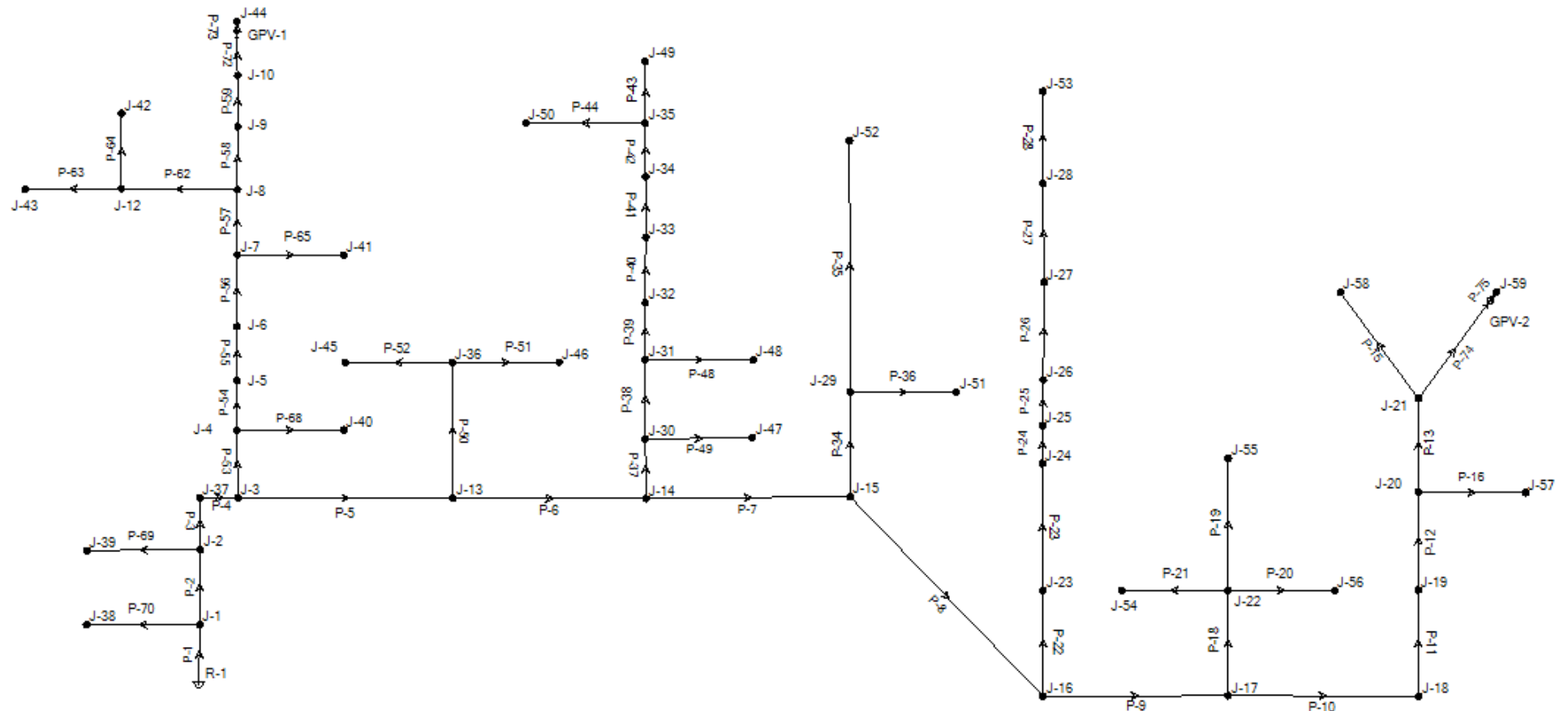
Risultati analoghi sono stati ottenuti in tutte le verifiche eseguite in reti irrigue analoghe.

Nonostante i ridotti valori dei carichi idraulici di esercizio e delle sovrappressioni di colpo d'ariete, che avrebbero giustificato l'adozione di tubazioni in PEAD PN6 si sono, a titolo cautelativo, adottate tubazioni PN10, più per ragioni di maggiore garanzia di statica trasversale nelle operazioni di posa in opera che di natura idraulica.

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FIG. 1 - SCHEMA PLANIMETRICO DELLA RETE IRRIGUA



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CALCOLO SOVRAPRESSIONI DI MOTO VARIO ELASTICO PER MANOVRA SULLA VALVOLA DI SEZIONAMENTO DEL COMIZIO N.74 (TEMPO DI CHIUSURA 50 SEC) - CASO “A” -

TAB. 1 - TABELLA MOTO VARIO ELASTICO PER MANOVRA DI CHIUSURA VALVOLA SEZIONAMENTO COMIZIO N.74 IN 50 SEC

ID	Label	Elevation (m)	Demand (L/s)	Head (Max) (m)	Head (Min) (m)	Pres (Max) (kPa)	Pres(Min) (kPa)	Hydraulic (m)
30	J-1	214.00	0	222.95	222.93	88	87	222.93
31	J-2	213.00	0	222.38	222.22	92	90	222.22
32	J-3	197.00	0	221.74	221.42	242	239	221.42
33	J-4	188.00	0	221.73	221.41	330	327	221.41
34	J-5	188.00	24	221.70	221.35	330	326	221.35
35	J-6	194.00	24	221.68	221.30	271	267	221.30
36	J-7	182.00	0	221.50	220.89	387	381	220.89
37	J-8	180.00	0	220.28	219.02	394	382	219.02
38	J-9	177.00	24	218.38	214.74	405	369	214.74
39	J-10	176.00	24	218.34	214.38	414	376	214.38
41	J-12	176.00	0	217.42	216.24	405	394	216.24
42	J-13	192.00	0	220.44	220.14	278	275	220.14
43	J-14	192.00	0	219.32	219.03	267	265	219.03
44	J-15	185.00	0	217.80	217.53	321	318	217.53
45	J-16	196.00	0	214.73	214.49	183	181	214.49
46	J-17	195.00	0	213.27	213.04	179	177	213.04

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47	J-18	195.00	0	212.32	212.09	170	167	212.09
48	J-19	190.00	24	211.11	210.89	207	204	210.89
49	J-20	186.00	0	210.18	209.96	237	235	209.96
50	J-21	175.00	0	206.07	205.87	304	302	205.88
51	J-22	195.00	0	213.20	212.97	178	176	212.97
52	J-23	195.00	8	214.54	214.30	191	189	214.30
53	J-24	181.00	0	212.61	212.37	309	307	212.37
54	J-25	180.00	0	209.84	209.62	292	290	209.62
55	J-26	177.00	0	206.96	206.75	293	291	206.75
56	J-27	174.00	0	204.36	204.16	297	295	204.16
57	J-28	170.00	16	203.75	203.55	330	328	203.55
58	J-29	183.00	0	217.56	217.28	338	336	217.28
59	J-30	194.00	0	219.26	218.97	247	244	218.97
60	J-31	190.00	0	218.71	218.42	281	278	218.42
61	J-32	194.00	24	218.53	218.24	240	237	218.24
62	J-33	183.00	0	217.66	217.37	339	336	217.37
63	J-34	173.00	24	216.94	216.66	430	427	216.66
64	J-35	177.00	0	215.86	215.58	380	378	215.58
65	J-36	192.00	0	220.39	220.09	278	275	220.09
103	J-37	200.00	0	221.87	221.58	214	211	221.58
174	J-38	213.00	32	222.93	222.92	97	97	222.92
175	J-39	212.00	32	222.37	222.21	101	100	222.21

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Relazione dei calcoli idraulici

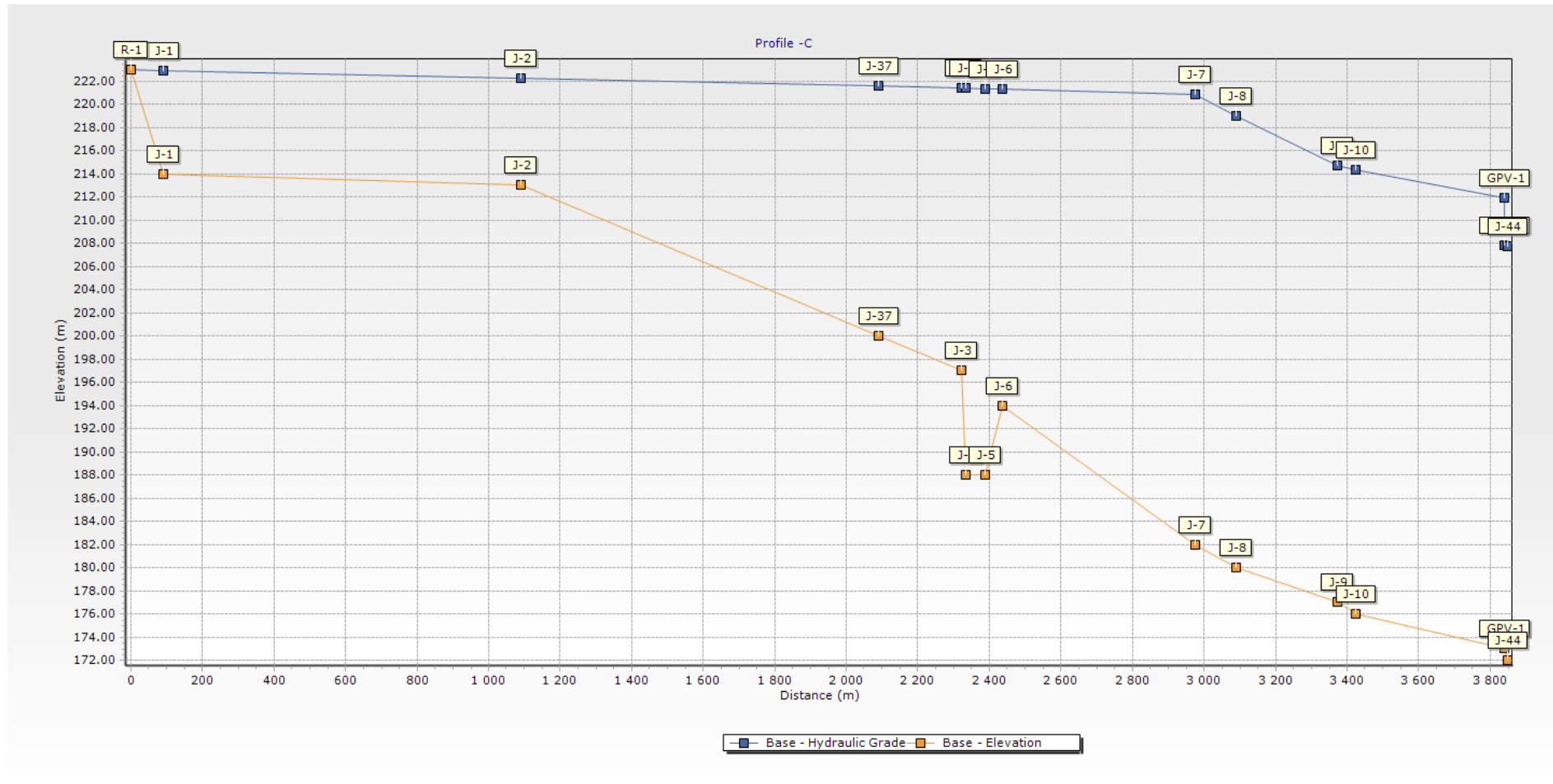
176	J-40	196.00	16	221.67	221.35	251	248	221.35
177	J-41	174.00	24	220.93	220.30	459	453	220.30
178	J-42	176.00	24	216.56	215.39	397	385	215.39
179	J-43	177.00	24	217.24	216.06	394	382	216.06
180	J-44	172.00	24	207.77	171.98	350	0	207.77
181	J-45	195.00	24	220.15	219.85	246	243	219.85
182	J-46	192.00	16	220.36	220.06	278	275	220.06
183	J-47	196.00	24	219.23	218.94	227	224	218.94
184	J-48	188.00	24	216.43	216.16	278	276	216.16
185	J-49	161.00	32	210.66	210.40	486	484	210.41
186	J-50	168.00	24	215.55	215.27	465	463	215.27
187	J-51	189.00	32	217.13	216.86	275	273	216.86
188	J-52	167.00	32	211.99	211.75	440	438	211.76
189	J-53	164.00	24	202.98	202.78	381	380	202.79
190	J-54	194.00	24	212.95	212.72	185	183	212.72
191	J-55	169.00	32	210.88	210.66	410	408	210.66
192	J-56	194.00	24	212.64	212.42	182	180	212.42
193	J-57	185.00	24	210.13	209.92	246	244	209.92
194	J-58	168.00	24	203.53	203.34	348	346	203.35
195	J-59	168.00	24	203.18	202.99	344	342	202.99

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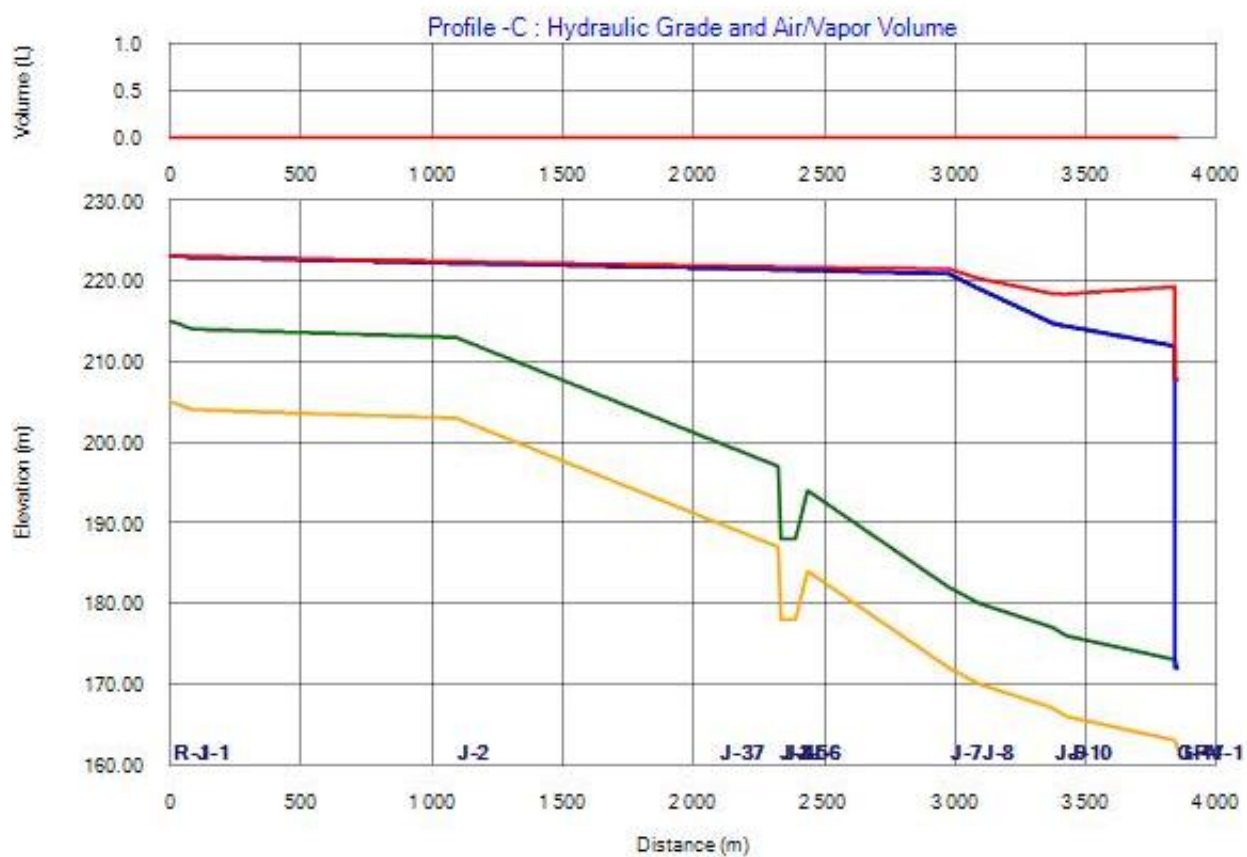
FIG. 2: PROFILO IDRAULICO PERCORSO DA VASCA A COMIZIO N.74 IN ESERCIZIO ORDINARIO



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FIG: 3 - PROFILO IDRAULICO PERCORSO DA VASCA A COMIZIO N.74 IN MOTO VARIO ELASTICO:
PIEZOMETRICA MAX E MIN PER MANOVRA CHIUSURA COMIZIO N.74 IN 50 SEC.



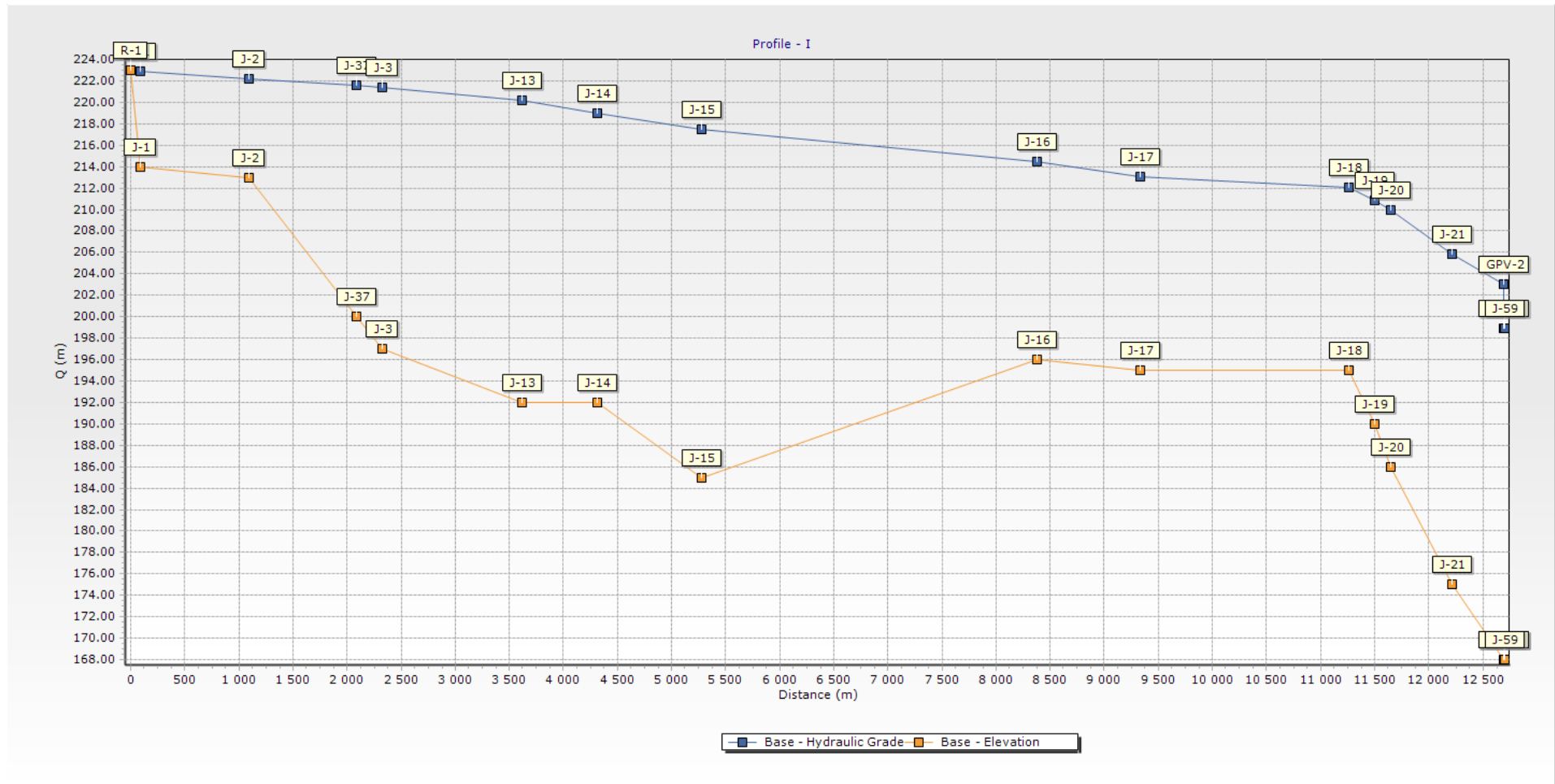
Consorzio di Bonifica n.2 - Palermo

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CALCOLO SOVRAPRESSIONI DI MOTO VARIO ELASTICO PER MANOVRA SULLA VALVOLA DI SEZIONAMENTO DEL COMIZIO N.100 (TEMPO DI CHIUSURA 30 SEC) - CASO "B" -

FIG: 4: PROFILO IDRAULICO PERCORSO I DA VASCA A COMIZIO 100 – CONDIZIONI DI ESERCIZIO ORDINARIO



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TAB. 2: TABELLA RISULTATI : TRONCHI

ID	Label	Length (m)	Nm	Nv	Diameter (mm)	Material	H-W	C (m/s)	Flow (l/s)	Vel (m/s)	HG(i) (m)	HG(f) (m)	Head iniz.(m)	Head max(m)	Head min(m)	Press. max(kPa)	Press. min(kPa)
101	P-1	90	R-1	J-1	1 000.0	Concrete	130.0	1 000	752	0.96	223.00	222.93	223.00	223.00	222.93	88	78
102	P-2	1 001	J-1	J-2	1 000.0	Concrete	130.0	1 000	720	0.92	222.93	222.22	222.90	222.95	222.22	92	87
104	P-3	1 000	J-2	J-37	1 000.0	Concrete	130.0	1 000	688	0.88	222.22	221.58	222.20	222.41	221.58	215	90
105	P-4	232	J-37	J-3	1 000.0	Concrete	130.0	1 000	688	0.88	221.58	221.42	221.60	221.92	221.42	243	211
106	P-5	1 300	J-3	J-13	800.0	Concrete	130.0	1 100	480	0.95	221.42	220.14	221.40	221.81	220.14	282	239
107	P-6	690	J-13	J-14	700.0	Concrete	130.0	1 100	440	1.14	220.14	219.03	220.10	220.83	219.03	282	265
108	P-7	965	J-14	J-15	600.0	Concrete	130.0	1 100	288	1.02	219.03	217.53	219.00	219.95	217.53	332	265
109	P-8	3 100	J-15	J-16	600.0	Concrete	130.0	1 100	224	0.79	217.53	214.49	217.50	218.88	214.49	332	181
110	P-9	955	J-16	J-17	500.0	Concrete	130.0	1 100	176	0.90	214.49	213.04	214.50	217.14	213.04	208	177
111	P-10	1 925	J-17	J-18	500.0	Concrete	130.0	1 100	96	0.49	213.04	212.09	213.00	216.33	212.09	209	167
112	P-11	239	J-18	J-19	350.0	PEAD	95.0	350.00	96	1.00	212.09	210.89	212.10	216.33	210.89	252	167
113	P-12	148	J-19	J-20	300.0	PEAD	95.0	350.00	72	1.02	210.89	209.96	210.90	215.74	209.96	288	204
114	P-13	570	J-20	J-21	250.0	PEAD	95.0	350.00	48	0.98	209.96	205.88	210.00	215.42	205.88	393	235
116	P-15	429	J-21	J-58	200.0	PEAD	95.0	350.00	24	0.86	205.88	203.35	205.90	215.14	203.34	431	302
117	P-16	23	J-20	J-57	250.0	PEAD	95.0	350.00	24	0.54	209.96	209.92	210.00	215.42	209.92	297	235
119	P-18	10	J-17	J-22	300.0	PEAD	95.0	350.00	80	1.21	213.04	212.97	213.00	216.26	212.97	208	176
120	P-19	682	J-22	J-55	250.0	PEAD	95.0	350.00	32	0.68	212.97	210.66	213.00	216.17	210.66	438	176
121	P-20	275	J-22	J-56	250.0	PEAD	95.0	350.00	24	0.53	212.97	212.42	213.00	216.17	212.42	211	176
122	P-21	122	J-22	J-54	250.0	PEAD	95.0	350.00	24	0.53	212.97	212.72	213.00	216.17	212.72	214	176

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123	P-22	27	J-16	J-23	250.0	PEAD	95.0	350.00	48	1.03	214.49	214.30	214.50	217.14	214.30	215	181
124	P-23	377	J-23	J-24	250.0	PEAD	95.0	350.00	40	0.85	214.30	212.37	214.30	216.94	212.37	333	189
125	P-24	538	J-24	J-25	250.0	PEAD	95.0	350.00	40	0.85	212.37	209.62	212.40	214.98	209.62	333	290
126	P-25	560	J-25	J-26	250.0	PEAD	95.0	350.00	40	0.84	209.62	206.75	209.60	212.18	206.75	315	290
127	P-26	171	J-26	J-27	200.0	PEAD	95.0	350.00	40	1.31	206.75	204.16	206.80	209.20	204.16	318	291
128	P-27	40	J-27	J-28	200.0	PEAD	95.0	350.00	40	1.31	204.16	203.55	204.20	206.46	203.55	351	295
129	P-28	130	J-28	J-53	200.0	PEAD	95.0	350.00	24	0.79	203.55	202.79	203.60	205.81	202.78	401	328
135	P-34	48	J-15	J-29	300.0	PEAD	95.0	350.00	64	0.92	217.53	217.28	217.50	218.88	217.28	349	318
136	P-35	551	J-29	J-52	200.0	PEAD	95.0	350.00	32	1.03	217.28	211.76	217.30	218.63	211.75	450	336
137	P-36	42	J-29	J-51	200.0	PEAD	95.0	350.00	32	1.04	217.28	216.86	217.30	218.63	216.86	349	273
138	P-37	10	J-14	J-30	400.0	PEAD	95.0	350.00	152	1.23	219.03	218.97	219.00	219.95	218.97	274	244
139	P-38	123	J-30	J-31	400.0	PEAD	95.0	350.00	128	1.03	218.97	218.42	219.00	219.89	218.42	287	244
140	P-39	57	J-31	J-32	400.0	PEAD	95.0	350.00	104	0.84	218.42	218.24	218.40	219.33	218.24	287	237
141	P-40	243	J-32	J-33	350.0	PEAD	95.0	350.00	80	0.84	218.24	217.37	218.20	219.16	217.37	345	237
142	P-41	200	J-33	J-34	350.0	PEAD	95.0	350.00	80	0.84	217.37	216.66	217.40	218.29	216.66	436	336
143	P-42	275	J-34	J-35	300.0	PEAD	95.0	350.00	56	0.80	216.66	215.58	216.70	217.57	215.58	436	378
144	P-43	515	J-35	J-49	200.0	PEAD	95.0	350.00	32	1.03	215.58	210.41	215.60	216.49	210.40	492	378
145	P-44	152	J-35	J-50	250.0	PEAD	95.0	350.00	24	0.49	215.58	215.27	215.60	216.49	215.27	472	378
149	P-48	383	J-31	J-48	200.0	PEAD	95.0	350.00	24	0.78	218.42	216.16	218.40	219.33	216.16	287	276
150	P-49	15	J-30	J-47	250.0	PEAD	95.0	350.00	24	0.50	218.97	218.94	219.00	219.89	218.94	253	224
151	P-50	10	J-13	J-36	250.0	PEAD	95.0	350.00	40	0.83	220.14	220.09	220.10	220.83	220.09	282	275
152	P-51	12	J-36	J-46	200.0	PEAD	95.0	350.00	16	0.52	220.09	220.06	220.10	220.78	220.06	282	275
153	P-52	122	J-36	J-45	250.0	PEAD	95.0	350.00	24	0.50	220.09	219.85	220.10	220.78	219.85	282	243
154	P-53	10	J-3	J-4	600.0	PEAD	95.0	350.00	208	0.74	221.42	221.41	221.40	221.81	221.41	331	239

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155	P-54	56	J-4	J-5	630.0	PEAD	95.0	350.00	192	0.62	221.41	221.35	221.40	221.79	221.35	331	326
156	P-55	46	J-5	J-6	600.0	PEAD	95.0	350.00	168	0.60	221.35	221.30	221.40	221.74	221.30	330	267
157	P-56	540	J-6	J-7	600.0	PEAD	95.0	350.00	144	0.51	221.30	220.89	221.30	221.69	220.89	384	267
158	P-57	116	J-7	J-8	300.0	PEAD	95.0	350.00	120	1.71	220.89	219.02	220.90	221.28	219.02	386	381
159	P-58	282	J-8	J-9	250.0	PEAD	95.0	350.00	72	1.47	219.02	214.74	219.00	219.40	214.74	386	369
160	P-59	50	J-9	J-10	250.0	PEAD	95.0	350.00	48	0.98	214.74	214.38	214.70	215.08	214.38	379	369
163	P-62	388	J-8	J-12	250.0	PEAD	95.0	350.00	48	0.98	219.02	216.24	219.00	219.40	216.24	397	382
164	P-63	31	J-12	J-43	200.0	PEAD	95.0	350.00	24	0.77	216.24	216.06	216.20	216.60	216.06	397	382
165	P-64	144	J-12	J-42	200.0	PEAD	95.0	350.00	24	0.77	216.24	215.39	216.20	216.60	215.39	397	385
166	P-65	297	J-7	J-41	250.0	PEAD	95.0	350.00	24	0.49	220.89	220.30	220.90	221.28	220.30	457	381
169	P-68	22	J-4	J-40	200.0	PEAD	95.0	350.00	16	0.51	221.41	221.35	221.40	221.79	221.35	331	248
170	P-69	10	J-2	J-39	300.0	PEAD	95.0	350.00	32	0.46	222.22	222.21	222.20	222.41	222.21	102	90
171	P-70	10	J-1	J-38	300.0	PEAD	95.0	350.00	32	0.45	222.93	222.92	222.90	222.95	222.92	97	87
197	P-72	416	J-10	GPV-1	200.0	PEAD	95.0	350.00	24	0.77	214.38	211.93	214.40	214.72	211.93	384	376
198	P-73	10	GPV-1	J-44	200.0	PEAD	95.0	350.00	24	0.77	207.83	207.77	207.80	208.11	207.77	353	341
205	P-74	478	J-21	GPV-2	200.0	PEAD	95.0	350.00	24	0.76	205.88	203.06	205.90	216.40	203.06	474	302
206	P-75	10	GPV-2	J-59	200.0	PEAD	95.0	350.00	24	0.76	198.96	198.90	199.00	198.96	167.99	303	0

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TAB. 3: TABELLA RISULTATI : NODI

ID	Label	Elevation (m)	Demand (L/s)	Head (Max) (m)	Head (Min) (m)	Pres (Max) (kPa)	Pres(Min) (kPa)	Hydraulic (m)
30	J-1	214.00	0	222.95	222.93	88	87	222.93
31	J-2	213.00	0	222.41	222.22	92	90	222.22
32	J-3	197.00	0	221.81	221.42	243	239	221.42
33	J-4	188.00	0	221.79	221.41	331	327	221.41
34	J-5	188.00	24	221.74	221.35	330	326	221.35
35	J-6	194.00	24	221.69	221.30	271	267	221.30
36	J-7	182.00	0	221.28	220.89	384	381	220.89
37	J-8	180.00	0	219.40	219.02	386	382	219.02
38	J-9	177.00	24	215.08	214.74	373	369	214.74
39	J-10	176.00	24	214.72	214.38	379	376	214.38
41	J-12	176.00	0	216.60	216.24	397	394	216.24
42	J-13	192.00	0	220.83	220.14	282	275	220.14
43	J-14	192.00	0	219.95	219.03	274	265	219.03
44	J-15	185.00	0	218.88	217.53	332	318	217.53
45	J-16	196.00	0	217.14	214.49	207	181	214.49
46	J-17	195.00	0	216.26	213.04	208	177	213.04
47	J-18	195.00	0	216.33	212.09	209	167	212.09
48	J-19	190.00	24	215.74	210.89	252	204	210.89
49	J-20	186.00	0	215.42	209.96	288	235	209.96
50	J-21	175.00	0	215.14	205.88	393	302	205.88

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51	J-22	195.00	0	216.17	212.97	207	176	212.97
52	J-23	195.00	8	216.94	214.30	215	189	214.30
53	J-24	181.00	0	214.98	212.37	333	307	212.37
54	J-25	180.00	0	212.18	209.62	315	290	209.62
55	J-26	177.00	0	209.20	206.75	315	291	206.75
56	J-27	174.00	0	206.46	204.16	318	295	204.16
57	J-28	170.00	16	205.81	203.55	351	328	203.55
58	J-29	183.00	0	218.63	217.28	349	336	217.28
59	J-30	194.00	0	219.89	218.97	253	244	218.97
60	J-31	190.00	0	219.33	218.42	287	278	218.42
61	J-32	194.00	24	219.16	218.24	246	237	218.24
62	J-33	183.00	0	218.29	217.37	345	336	217.37
63	J-34	173.00	24	217.57	216.66	436	427	216.66
64	J-35	177.00	0	216.49	215.58	386	378	215.58
65	J-36	192.00	0	220.78	220.09	282	275	220.09
103	J-37	200.00	0	221.92	221.58	215	211	221.58
174	J-38	213.00	32	222.93	222.92	97	97	222.92
175	J-39	212.00	32	222.39	222.21	102	100	222.21
176	J-40	196.00	16	221.73	221.35	252	248	221.35
177	J-41	174.00	24	220.69	220.30	457	453	220.30
178	J-42	176.00	24	215.74	215.39	389	385	215.39
179	J-43	177.00	24	216.41	216.06	386	382	216.06
180	J-44	172.00	24	208.06	207.77	353	350	207.77

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181	J-45	195.00	24	220.53	219.85	250	243	219.85
182	J-46	192.00	16	220.75	220.06	281	275	220.06
183	J-47	196.00	24	219.86	218.94	233	224	218.94
184	J-48	188.00	24	217.01	216.16	284	276	216.16
185	J-49	161.00	32	211.24	210.40	492	484	210.41
186	J-50	168.00	24	216.18	215.27	472	463	215.27
187	J-51	189.00	32	218.19	216.86	286	273	216.86
188	J-52	167.00	32	212.95	211.75	450	438	211.76
189	J-53	164.00	24	205.01	202.78	401	380	202.79
190	J-54	194.00	24	215.90	212.72	214	183	212.72
191	J-55	169.00	32	213.75	210.66	438	408	210.66
192	J-56	194.00	24	215.56	212.42	211	180	212.42
193	J-57	185.00	24	215.37	209.92	297	244	209.92
194	J-58	168.00	24	212.01	203.34	431	346	203.35
195	J-59	168.00	24	198.90	167.99	302	0	198.90

Consorzio di Bonifica n.2 - Palermo

"Ammodernamento della rete irrigua dello Jato – I lotto sotto sollevamento" - Progetto Definitivo

Relazione dei calcoli idraulici

PROFILO IDRAULICO PERCORSO DA VASCA A COMIZIO N.74 IN MOTO VARIO ELASTICO:

PIEZOMETRICA MAX E MIN PER MANOVRA CHIUSURA COMIZIO N.100 IN 30 SEC.

