OR–ENG–11a
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2/71
(File code ENG–18)

US DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
OREGON

PIPELINE HYDRAULICS

State OREGON	Project			
By	Date	Checked by	Date	Job No.
Friction Loss – Hazen–Williams Equation		$C_1 =$ _____		Sheet _____ of _____

Station	Elevation		Operating Head		Pipe				Capacity Q		h_f from Charts of Tables	Section Length L	Friction Loss in Section $H_f = h_f L$	Other Losses	Accumu–lated Loss
	Hydraulic Grade Line	Ground Surface			Type Class Gage	Inside Dia. (Ins.)	Allowable Working Head								
			feet	psi			feet	psi	cfs	GPM	(ft/ft)	(feet)	(ft)	(feet)	(feet)

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By Date Checked by Date Job No.

Mannings "n" _____ Maximum Static W. S. Elevation _____ Sheet ____ of ____

Station	Elevation		Operating Head		Pipe				Length L (feet)	$f = \left(\frac{n}{.463d^{2.67}}\right)^2$	Capacity		Q^2 $(cfs)^2$	$s=fQ^2$ ft/ft	$h_f = sL = fQ^2L$	h_f Accumulated
	Hydraulic Grade Line	Ground Surface	feet	psi	Type Class Gage	Inside Dia. (Ins.)	Allowable Working Head feet	Allowable Working Head psi			cfs	GPM				

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PIPELINE HYDRAULICS

State OREGON | Project | Location

Computed By | Date | Checked by | Date | Job No.

Maximum Static W. S. Elevation _____ Sheet ____ of ____

Station	Elevation		Operating Head (ft)	Pipe			Length L (ft)	"n"	Kp	X Sect. Area (feet ^{2})	Capacity Q GPM or cfs	Velocity V (fps)	$\frac{V^2}{2g}$	Head Loss Co–Efficients						Head Loss $\Sigma K \frac{V^2}{2g}$ ft.
	Hydraulic Grade Line	Ground Surface		Inside Dia. (ins)	Type, Class or Gage	Working Head (ft)								$K_f = KpL$	K_e	K( )	K( )	K( )	ΣK	