1 Step 1

L1 Trigger seeds	Offline Threshold(s) [GeV]	Rate $\langle PU \rangle = 200$ [kHz]	Additional Requirement(s) [cm, GeV]	Objects plateau [%]
Single/Double/Triple Lepton (electron, muon) seeds				
Single tkMuon	22	9	$|\eta| < 2.4$	95
Double tkMuon	15,7	1	$|\eta| < 2.4$, $\Delta z < 1$	95
Single tkElectron	36	28	$|\eta| < 2.4$	93
Single tkIsoElectron	28	37	$|\eta| < 2.4$	93
TkIsoElectron-StaEG	22,12	30	$|\eta| < 2.4$	93,99
Double tkElectron	25,12	14	$|\eta| < 2.4$, $\Delta z < 1$	93
Single StaEG	51	32	$|\eta| < 2.4$	99
Double StaEG	37,24	6	$|\eta| < 2.4$	99
Photon seeds				
Single TkIsoPhoton	36	39	$|\eta| < 2.4$	97
Double TkIsoPhoton	22,12	20	$|\eta| < 2.4$	97
Tau seeds				
Single CaloTau	150	57	$|\eta| < 2.172$	99
Double CaloTau	90,90	64	$|\eta| < 2.172$, $\Delta R > 0.5$	99
Double PuppiTau	52,52	28	$|\eta| < 2.172$, $\Delta R > 0.5$, LooseNN > 0	90
Hadronic seeds (jets, H_T)				
Single PuppiJet	230	34	$|\eta| < 2.4$	100
Double PuppiJet	112,112	89	$|\eta| < 2.4$, $\Delta\eta < 1.6$	100
PuppiH_T	450	10	jets: $|\eta| < 2.4$, $p_T > 30$	100
Puppi$\displaystyle{\not}H_T$	135	14	jets: $|\eta| < 2.4$, $p_T > 30$	100
QuadPuppiJets-PuppiH_T (**)	400,70,55,40,40	17	jets: $|\eta| < 2.4$, $p_T > 25$	100,100
E_T^{miss} seeds				
PuppiE_T^{miss}	200	31		100
Cross Lepton seeds				
TkMuon-TkIsoElectron	7,20	0	$|\eta| < 2.4$, $\Delta z < 1$	95,93
TkMuon-TkElectron	7,23	1	$|\eta| < 2.4$, $\Delta z < 1$	95,93
TkElectron-TkMuon	10,20	1	$|\eta| < 2.4$, $\Delta z < 1$	93,95
Triple TkMuon	5,3,3	2	$|\eta| < 2.4$, $\Delta z < 1$, Qual¿0	95
TkMuon-DoubleTkElectron	17,17,6	0	$|\eta| < 2.4$, $\Delta z < 1$	95,93
DoubleTkMuon-TkElectron	9,5,5	0	$|\eta| < 2.4$, $\Delta z < 1$, Qual¿0	95,93
PuppiTau-TkMuon	18,42	2	$|\eta| < 2.172$, $|\eta| < 2.1$, $\Delta z < 1$, LooseNN > 0	90,95
TkIsoElectron-PuppiTau	22,45	28	$|\eta| < 2.172$, $|\eta| < 2.1$, $\Delta z < 1$, LooseNN > 0	93,90
Cross Hadronic-Lepton seeds				
TkMuon-PuppiH_T	6,320	1	$|\eta| < 2.4$, $\Delta z < 1$	95,100
TkMuon-TriplePuppiJet	12,40,40,40	33	$|\eta| < 2.4$, $\Delta R_{j1\mu} < 0.4$,$\Delta\eta_{j2j3} < 1.6$, $\Delta z < 1$	95,100
DoubleTkElectron-PuppiH_T	8,8,390	8	$|\eta| < 2.4$, $\Delta z < 1$	93,100
DoubleTkMuon-PuppiH_T	3,3,300	0	$|\eta| < 2.4$, $\Delta z < 1$, Qual¿0	93,100
DoubleTkMuon-PuppiJet-PuppiETmiss	3,3,60,130	1	$|\eta| < 2.4$, $\Delta z < 1$, Qual¿0	95,100,100
TkIsoElectron-PuppiH_T	26,190	13	$|\eta| < 2.4$, $\Delta z < 1$, LooseNN > 0	93,100
TkElectron-PuppiJet (**)	28,40	54	$|\eta| < 2.1$, $|\eta| < 2.4$, $\Delta R > 0.3$, $\Delta z < 1$	93,100
PuppiTau-PuppiE_T^{miss}	55,190	10	$|\eta| < 2.172$, LooseNN > 0	90,100
TkMuon-PuppiJet-PuppiETmiss	3,110,120	18	$|\eta| < 2.4$, $\Delta z < 1$, Qual¿0	95,100,100
VBF seeds				
Double PuppiJets (**)	160,35	50	$|\eta| < 5$, $m_{jj} > 620$	100
BPH seeds				
Double TkMuon 0er1p5_SQ_OS_dR_Max1p4	2,2	12	$|\eta| < 1.5$, $\Delta z < 1$, $\Delta R < 1.4$, $q_1 \times q_2 < 0$	95
Double TkMuon 4_SQ_OS_dR_Max1p	4,4	5	$|\eta| < 2.4$, $\Delta z < 1$, $\Delta R < 1.5$, $q_1 \times q_2 < 0$, Qual¿0	95
Double TkMuon 4p5er2p0_SQ_OS_Mass7to18	4,4	3	$|\eta| < 2.0$, $\Delta z < 1$, $7 < m < 18$, $q_1 \times q_2 < 0$, Qual¿0	95
Triple TkMuon 5SQ_3SQ_0OQ_DoubleMu_5_3_SQ_OS_Mass_Max9	5,3,0	1	$|\eta| < 2.4$, $\Delta z < 1$, $p_{T,1} > 5$, $p_{T,2} > 3$, $p_{T,3} > 0$, $0 < m < 9$, $q_1 \times q_2 < 0$, Qual¿0	95
Triple TkMuon 5_3p5_2p5_OS_Mass_5to17	5,3,2	0	$|\eta| < 2.4$, $\Delta z < 1$, $p_{T,1} > 5$, $p_{T,2} > 3.5$, $p_{T,3} > 2.5$, $5 < m < 17$, $q_1 \times q_2 < 0$, Qual¿0	95
Rate for above Trigger seeds				395
Total Menu Rate (+30%)				513

2 Step 2

L1 Trigger seeds	Offline Threshold(s) [GeV]	Rate $\langle PU \rangle = 200$ [kHz]	Additional Requirement(s) [cm, GeV]	Objects plateau [%]
BPH seeds				
QuadPuppiJets-PuppiH_T	299,25,25,25,25	14	$\|\eta\| < 2.4$, Tot. b-tag score > 2.2	95
SC8 seeds				
Single Ak8 PuppiJet	230	59	$\|\eta\| < 2.4$	100
Double Ak8 PuppiJet	200,200	13	$\|\eta\| < 2.4$, $\Delta\eta_{j1j2} < 1.6$	100
Displaced Muons				
Single Displaced Muon	22	56	$\|\eta\| < 2.0$, Qual ≥ 15	99
Single Displaced Muon	15,7	14	$\|\eta\| < 2.4$	99
GMT				
Track Triplet for W3Pi	-99	1		100
Rate for above Trigger seeds				132
Total Menu Rate (+30%)				171

3 Step 1 + Step 2

L1 Trigger seeds	Offline Threshold(s) [GeV]	Rate $\langle PU \rangle = 200$ [kHz]	Additional Requirement(s) [cm, GeV]	Objects plateau [%]
Single/Double/Triple Lepton (electron, muon) seeds				
Single tkMuon	22	8	$|\eta| < 2.4$	95
Double tkMuon	15,7	1	$|\eta| < 2.4$, $\Delta z < 1$	95
Single tkElectron	36	28	$|\eta| < 2.4$	93
Single tkIsoElectron	28	37	$|\eta| < 2.4$	93
TkIsoElectron-StaEG	22,12	30	$|\eta| < 2.4$	93,99
Double tkElectron	25,12	14	$|\eta| < 2.4$, $\Delta z < 1$	93
Single StaEG	51	32	$|\eta| < 2.4$	99
Double StaEG	37,24	6	$|\eta| < 2.4$	99
Photon seeds				
Single TkIsoPhoton	36	39	$|\eta| < 2.4$	97
Double TkIsoPhoton	22,12	20	$|\eta| < 2.4$	97
Tau seeds				
Single CaloTau	150	57	$|\eta| < 2.172$	99
Double CaloTau	90,90	64	$|\eta| < 2.172$, $\Delta R > 0.5$	99
Double PuppiTau	52,52	28	$|\eta| < 2.172$, $\Delta R > 0.5$, LooseNN > 0	90
Hadronic seeds (jets,H_T)				
Single PuppiJet	230	38	$|\eta| < 2.4$	100
Double PuppiJet	112,112	99	$|\eta| < 2.4$, $\Delta\eta < 1.6$	100
PuppiH_T	450	10	jets: $|\eta| < 2.4$, $p_T > 30$	100
Puppi$\not{H}_T$	135	14	jets: $|\eta| < 2.4$, $p_T > 30$	100
QuadPuppiJets-PuppiH_T(**)	400,70,55,40,40	10	jets: $|\eta| < 2.4$, $p_T > 25$	100,100
E_T^{miss} seeds				
PuppiE_T^{miss}	200	31		100
Cross Lepton seeds				
TkMuon-TkIsoElectron	7,20	0	$|\eta| < 2.4$, $\Delta z < 1$	95,93
TkMuon-TkElectron	7,23	1	$|\eta| < 2.4$, $\Delta z < 1$	95,93
TkElectron-TkMuon	10,20	1	$|\eta| < 2.4$, $\Delta z < 1$	93,95
Triple TkMuon	5,3,3	1	$|\eta| < 2.4$, $\Delta z < 1$, Qual > 0	95
TkMuon-DoubleTkElectron	17,17,6	0	$|\eta| < 2.4$, $\Delta z < 1$	95,93
DoubleTkMuon-TkElectron	9,5,5	0	$|\eta| < 2.4$, $\Delta z < 1$, Qual > 0	95,93
PuppiTau-TkMuon	18,42	2	$|\eta| < 2.172$, $|\eta| < 2.1$, $\Delta z < 1$, LooseNN > 0	90,95
TkIsoElectron-PuppiTau	22,45	28	$|\eta| < 2.172$, $|\eta| < 2.1$, $\Delta z < 1$, LooseNN > 0	93,90
Cross Hadronic-Lepton seeds				
TkMuon-PuppiH_T	6,320	1	$|\eta| < 2.4$, $\Delta z < 1$	95,100
TkMuon-TriplePuppiJet	12,40,40,40	4	$|\eta| < 2.4$, $\Delta R_{j1\mu} < 0.4$, $\Delta\eta_{j2j3} < 1.6$, $\Delta z < 1$	95,100
DoubleTkElectron-PuppiH_T	8,8,390	8	$|\eta| < 2.4$, $\Delta z < 1$	93,100
DoubleTkMuon-PuppiH_T	3,3,300	0	$|\eta| < 2.4$, $\Delta z < 1$, Qual > 0	93,100
DoubleTkMuon-PuppiJet-PuppiETmiss	3,3,60,130	1	$|\eta| < 2.4$, $\Delta z < 1$, Qual > 0	95,100,100
TkIsoElectron-PuppiH_T	26,190	13	$|\eta| < 2.4$, $\Delta z < 1$, LooseNN > 0	93,100
TkElectron-PuppiJet (**)	28,40	48	$|\eta| < 2.1$, $|\eta| < 2.4$, $\Delta R > 0.3$, $\Delta z < 1$	93,100
PuppiTau-PuppiE_T^{miss}	55,190	10	$|\eta| < 2.172$, LooseNN > 0	90,100
TkMuon-PuppiJet-PuppiETmiss	3,110,120	18	$|\eta| < 2.4$, $\Delta z < 1$, Qual > 0	95,100,100
VBF seeds				
Double PuppiJets (**)	160,35	42	$|\eta| < 5$, $m_{jj} > 620$	100
BPH seeds				
Double TkMuon 0er1p5_SQ_OS_dR_Max1p4	2,2	9	$|\eta| < 1.5$, $\Delta z < 1$, $\Delta R < 1.4$, $q_1 \times q_2 < 0$	95
Double TkMuon 4_SQ_OS_dR_Max1p	4,4	4	$|\eta| < 2.4$, $\Delta z < 1$, $\Delta R < 1.5$, $q_1 \times q_2 < 0$, Qual > 0	95
Double TkMuon 4p5er2p0_SQ_OS_Mass7to18	4,4	2	$|\eta| < 2.0$, $\Delta z < 1$, $7 < m < 18$, $q_1 \times q_2 < 0$, Qual > 0	95
Triple TkMuon 5SQ_3SQ_0OQ_DoubleMu_5_3_SQ_OS_Mass_Max9	5,3,0	1	$|\eta| < 2.4$, $\Delta z < 1$, $p_{T,1} > 5$, $p_{T,2} > 3$, $p_{T,3} > 0$, $0 < m < 9$, $q_1 \times q_2 < 0$, Qual > 0	95
Triple TkMuon 5_3p5_2p5_OS_Mass_5to17	5,3,2	0	$|\eta| < 2.4$, $\Delta z < 1$, $p_{T,1} > 5$, $p_{T,2} > 3.5$, $p_{T,3} > 2.5$, $5 < m < 17$, $q_1 \times q_2 < 0$, Qual > 0	95
QuadPuppiJets-PuppiH_T	299,25,25,25,25	14	$|\eta| < 2.4$, Tot. b-tag score > 2.2	95
SC8 seeds				
Single Ak8 PuppiJet	230	59	$|\eta| < 2.4$	100
Double Ak8 PuppiJet	200,200	13	$|\eta| < 2.4$, $\Delta\eta_{j1j2} < 1.6$	100
Displaced Muons				
Single Displaced Muon	22	56	$|\eta| < 2.0$, Qual ≥ 15	99
Single Displaced Muon	15,7	14	$|\eta| < 2.4$	99
GMT				
Track Triplet for W3Pi	-99	1		100
Rate for above Trigger seeds				436
Total Menu Rate (+30%)				566