

Category	Lepton, jet, and $p_{\text{T}}^{\text{miss}}$ requirements				Binning/optimization selections		
	N_{ℓ}	N_{jet}	N_{b}	$p_{\text{T}}^{\text{miss}}$ (GeV)	$m_{\ell\ell}$ (GeV)	$p_{\text{T},\ell\ell\gamma}/m_{\ell\ell\gamma}$	I_{mini}
ggF	=2	≤ 1		<90	[Binned by ggF BDT (4 bins)]		
VBF	=2	≥ 2	=0		[Binned by VBF BDT (4 bins)]		
VH $N_{\ell} \geq 3$	≥ 3		=0	>30		>0.3	<0.15
VH $p_{\text{T}}^{\text{miss}}$	=2	≤ 1		>90		>0.4	
t $\bar{\text{t}}$ H leptonic	=3	≥ 3	≥ 1				<0.1
	≥ 4	≥ 1	≥ 1				
t $\bar{\text{t}}$ H hadronic	=2	≥ 5	≥ 1		(85, 95)		
Untagged	Events passing baseline selection not assigned to any other category						