Selection step	$2\ell\mathrm{SS} + 0\tau_\mathrm{h}$	$2\ell\mathrm{SS} + 1\tau_\mathrm{h}$
Targeted t$\bar{\text{t}}$H decay	t $\to$ b$\ell\nu$, t $\to$ bqq$'$ with	t $\to$ b$\ell\nu$, t $\to$ bqq$'$ with
	H $\to$ WW $\to$ $\ell\nu$qq$'$	H $\to$ $\tau\tau$ $\to$ $\ell\nu\nu\tau_\mathrm{h}\nu$
Targeted tH decays	t $\to$ b$\ell\nu$,	t $\to$ b$\ell\nu$,
	H $\to$ WW $\to$ $\ell\nu$qq$'$	H $\to$ $\tau\tau$ $\to$ $\ell\tau_\mathrm{h}$ + ν's
Trigger	Single- and double-lepton triggers	
Lepton p_T	$p_\mathrm{T} > 25$ / $15\,\mathrm{GeV}$	$p_\mathrm{T} > 25$ / $15\,\mathrm{GeV}$ (e) or $10\,\mathrm{GeV}$ (μ)
Lepton η	$\lvert\eta\rvert < 2.5$ (e) or 2.4 (μ)	
τ_h p_T	—	$p_\mathrm{T} > 20\,\mathrm{GeV}$
τ_h η	—	$\lvert\eta\rvert < 2.3$
τ_h identification	—	very loose
Charge requirements	2 SS leptons	2 SS leptons
	and charge quality requirements	and charge quality requirements
		$\sum_{\ell,\tau_\mathrm{h}} q = \pm 1$
Multiplicity of central jets	$\geq$3 jets	$\geq$3 jets
b tagging requirements	$\geq$1 tight b-tagged jet or $\geq$2 loose b-tagged jets	
Missing transverse momentum	$L_\mathrm{D} > 30\,\mathrm{GeV}^{\dagger}$	
Dilepton invariant mass	$\lvert m_{\ell\ell} - m_\mathrm{Z}\rvert > 10\,\mathrm{GeV}^{\ddagger}$ and $m_{\ell\ell} > 12\,\mathrm{GeV}$	

Selection step	$3\ell + 0\tau_\mathrm{h}$	$3\ell + 1\tau_\mathrm{h}$
Targeted t$\bar{\text{t}}$H decays	t $\to$ b$\ell\nu$, t $\to$ b$\ell\nu$ with	t $\to$ b$\ell\nu$, t $\to$ b$\ell\nu$ with
	H $\to$ WW $\to$ $\ell\nu$qq$'$	H $\to$ $\tau\tau$ $\to$ $\ell\nu\nu\tau_\mathrm{h}\nu$
	t $\to$ b$\ell\nu$, t $\to$ bqq$'$ with	
	H $\to$ WW $\to$ $\ell\nu\ell\nu$	
	t $\to$ b$\ell\nu$, t $\to$ bqq$'$ with	
	H $\to$ ZZ $\to$ $\ell\ell$qq$'$ or $\ell\ell\nu\nu$	
Targeted tH decays	t $\to$ b$\ell\nu$, H $\to$ WW $\to$ $\ell\nu\ell\nu$	—
Trigger	Single-, double- and triple-lepton triggers	
Lepton p_T	$p_\mathrm{T} > 25$ / 15 / $10\,\mathrm{GeV}$	
Lepton η	$\lvert\eta\rvert < 2.5$ (e) or 2.4 (μ)	
τ_h p_T	—	$p_\mathrm{T} > 20\,\mathrm{GeV}$
τ_h η	—	$\lvert\eta\rvert < 2.3$
τ_h identification	—	very loose
Charge requirements	$\sum_{\ell} q = \pm 1$	$\sum_{\ell,\tau_\mathrm{h}} q = 0$
Multiplicity of central jets	$\geq$2 jets	
b tagging requirements	$\geq$1 tight b-tagged jet or $\geq$2 loose b-tagged jets	
Missing transverse momentum	$L_\mathrm{D} > 0$ / 30 / $45\,\mathrm{GeV}^{\ddagger}$	
Dilepton invariant mass	$m_{\ell\ell} > 12\,\mathrm{GeV}$ and $\lvert m_{\ell\ell} - m_\mathrm{Z}\rvert > 10\,\mathrm{GeV}^{\S}$	
Four-lepton invariant mass	$m_{4\ell} > 140\,\mathrm{GeV}^{\P}$	—

† A complete description of this requirement can be found in the main text.
‡ Applied to all SFOS lepton pairs and to pairs of electrons of SS charge.
§ Applied to all SFOS lepton pairs.
¶ If the event contains two SFOS pairs of leptons that pass the loose lepton selection criteria.