

## APPENDIX 4EE

# **FIS REQUIREMENTS FOR THE DESIGN OF FREESTYLE SKIING AND SNOWBOARD STADIUMS FOR THE OLYMPIC VENUES 2022**

# **DESIGN REQUIREMENTS OLYMPIC WINTER GAMES 2022 FIS FREESTYLE SKIING AND FIS SNOWBOARD**

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# INTRODUCTION

This file contains the technical requirements, course specifications and background information for the Freestyle Skiing and Snowboarding Disciplines for the development of the 2022 Olympic Winter Games courses, stadiums and venue.

The focus of the information is to prepare designs for top level courses, finish zones and stadiums for Olympic Candidate Cities.

The setup of the venue was based upon design standards used in the past 4 Olympic Games. The information is outlined by;

- ❑ Background - Olympic Winter Games
- ❑ Design Requirements and Standards
- ❑ Course Specifications and Technical Requirements
- ❑ Sport Infrastructure

# DESIGN GLOSSARY AND ABBREVIATIONS

**Sport** = Skiing and Snowboarding

**Disciplines** = FIS Freestyle Skiing and FIS Snowboarding

**FOP** = Field Of Play includes Start Area, the Course and the Finish Area

**Events** = HP, SX, PGS, BA, MO, AE, SBX, SBS and SS

**MO** = Moguls Freestyle Discipline, OWGs event since 1992

**AE** = Aerials Freestyle Discipline, OWG event since 1994

**SX** = Ski Cross Freestyle Discipline, OWG 2010, also known as "Cross"

**HP** = Halfpipe Ski and Snowboard event, OWG 1998, also known as "Pipe"

**PGS** = Parallel Giant Slalom Snowboard Discipline, OWG 1998

**BA** = Big Air Snowboard Discipline, OWG from 2018

**SBX** = Snowboard Cross event, Winter Olympic Games event since 2006, also known as "Cross"

**SBS** = Snowboard Slopestyle event, OWG event since 2014, also known as "Slope"

**SS** = Ski Slopestyle event, OWG event since 2014, also known as "Slope"

**Finish Area** = the deceleration zone beyond the finish line at 0 degree angle

**Finish Zone** = A location which contain several finish areas.

**Start Area** = Contains a start device and flat space where competitors and equipment is prepared

**Winch** is a type snow grooming equipment with mechanical system with cable.

**Park** = is type of grooming machines designed for snow-parks

**Course** = 'Inside of the Fences' Course Specification

**Stadium** = Includes, the Course and the Spectator Viewing Area

**Venue** = Includes the Stadium and all of the related Infrastructure

**IF** = International Federation, International Ski Federation (FIS)

**OC** = Organizers of the OWG

**OWG** = Olympic Winter Games

**Discipline** = is a branch of a sport comprising 1 or several events

**Event** = is a competition in a sport or in one of its disciplines, resulting in a ranking.

**ICR** = International Competition Rules, Version 2014

**Skier / Rider / Sliders Left** and **Skier / Riders / Sliders Right**, = is the position of the viewers to the course.

**Front of House** (abbreviated **FOH**) is the portion of a performance venue that is open to the public.

**Back of House** (abbreviated **BOH**) is the portion of a performance venue that is not open to the public.

**Phase** = is the progression system in a competition.

**Course Specifications** = an explicit set of requirements *to be satisfied* by a material, design, product, or service

**Vertical Drop** = Vertical drop the total difference expressed in meters from the start elevation to the finish elevation.

**Start Zone** = Contains the pre-Start area, warmup area, equipment preparation zone, start device,, start structure and start area.

**Skiway** = Is an established trail leading to one main run to different parts of the course.

**Technical Road** = a pathway used by snow-grooming machines

**Video Wall** = Is a large outdoor digital screen near the course

# Background - Olympic Winter Games

## Freestyle Skiing and Snowboarding Development 1992 - 2018



# BACKGROUND

The Olympic Winter Games Freestyle Skiing and Snowboarding events, presently include of:

- ❑ Moguls (2 events)
- ❑ Aerials (2 events)
- ❑ Snowboard and Ski Cross (4 events)
- ❑ Snowboard and Ski Slopestyle (4 events),
- ❑ Snowboard and Ski Halfpipe (4 events)
- ❑ Snowboard Parallel Giant Slalom (2 events)
- ❑ Snowboard Big Air (2 events)

The Freestyle Skiing and Snowboard disciplines shared the development of pipe, cross and slopestyle events (60% of program).

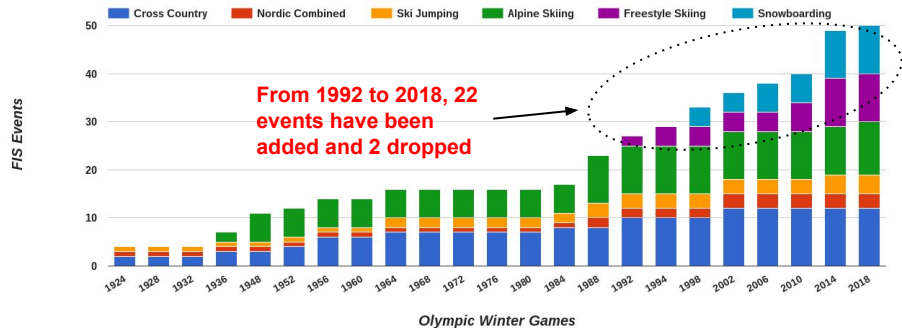
In 2022, there will be total of 20 competitions between Freestyle Skiing (10 events) and Snowboard (10 events).

# DEVELOPMENT OF THE OLYMPIC PROGRAM FREESTYLE SKIING AND SNOWBOARD

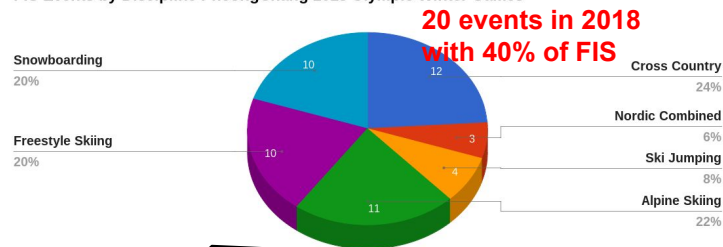
Olympic Winter Games	Freestyle Ski	Snowboard	Total
1. Albertville 1992	2		2
2. Lillehammer 1994	4		4
3. Nagano 1998	4	4	8
4. Salt Lake 2002	4	4	8
5. Torino 2006	4	6	10
6. Vancouver 2010	6	6	12
7. Sochi 2014	10	10	20
8. PyeongChang 2018	<u>10</u>	<u>10</u>	<u>20</u>
<b>Total</b>	<b>44</b>	<b>40</b>	<b>64</b>

# The Development of Olympic Freestyle Skiing and Snowboard

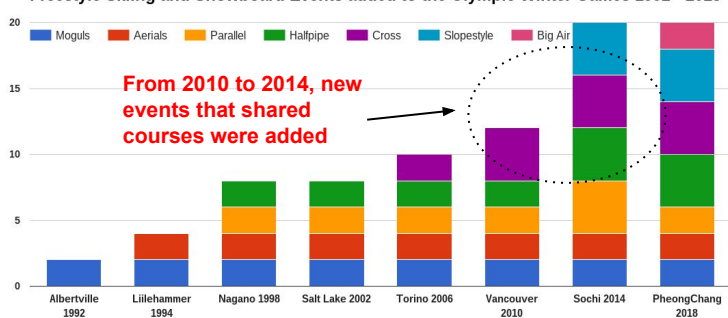
FIS Disciplines and the Development of Medal Events at Olympic Winter Games from 1924-2018



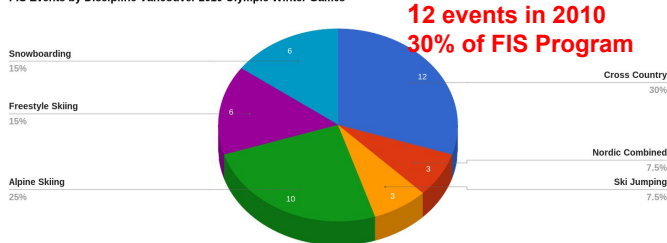
FIS Events by Discipline PheongChang 2018 Olympic Winter Games



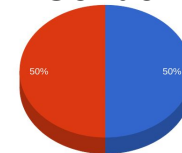
Freestyle Skiing and Snowboard Events added to the Olympic Winter Games 1992 - 2018



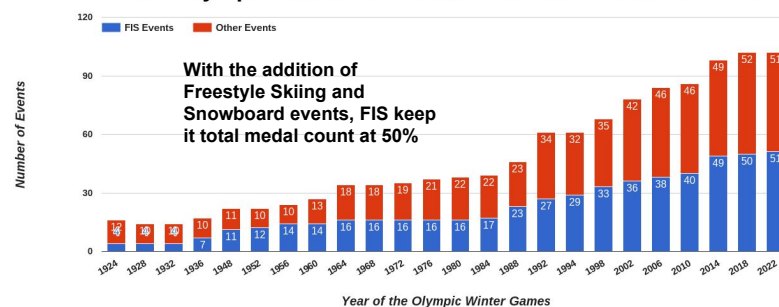
FIS Events by Discipline Vancouver 2010 Olympic Winter Games



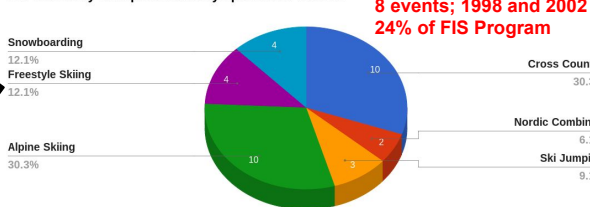
Gender



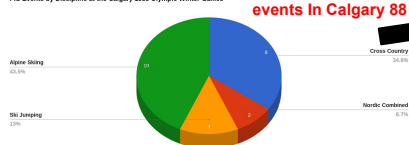
Winter Olympic Games FIS Events and Other Events 1924-2022



FIS Events by Discipline 2002 Olympic Winter Games



FIS Events by Discipline at the Calgary 1988 Olympic Winter Games





# DESIGN PROCESS, REQUIREMENTS and STANDARDS

## Technical Requirements



# GOAL: CREATE A DYNAMIC REACTION

- ❑ In Freestyle Skiing and Snowboarding, we **create a dynamic reaction** between **the spectators** in the stands / venue **and the athletes**.
- ❑ The better the **stadium design**, the **sport presentation**, the presentation with our rules and specifications, **the better the emotional reaction** we can generate from the crowd / athletes and then the better the **TV pictures**.

# IOC CHARTER BY LAW 47

## TECHNICAL RESPONSIBILITIES

### OF THE IF'S AT THE OLYMPIC GAMES

- '1. Each IF is responsible for the technical control and direction of its sport at the Olympic Games; all elements of the competitions, including the schedule, field of play, training sites and all equipment must comply with its rules. For all these technical arrangements, the OCOG must consult the relevant IFs. The holding of all events in each sport is placed under the direct responsibility of the IF concerned.'*
- 2. The OCOG must ensure that the various sports included in the programme of the Olympic Games are treated and integrated equitably.'*

# DESIGN REQUIREMENTS

- ❑ To produce the **best designed courses, stadiums and venue** in the world, which allow for the best performances, which will create historical moments for winter snow sports.
- ❑ To provide **digital mapping** to .5 to 1.0m scale of the venue
- ❑ To produce **3D graphic** rendering of the courses and stadiums
- ❑ To **review the past design** success and failures in order to improve upon the setup for Vancouver 2010/ Cypress and Sochi 2014 / Rosa Khutor and 2018 / PyeongChang
- ❑ **Legacy Development** for freestyle skiing and snowboarding including the host venue needs to be designed and built for the **future of winter sports**

# Design Process - Integration of the Best Ski Resort Principles and FIS Course Standards

- ❑ The best practices of ski area design need to be combined with the highest level of course and stadium development to create the best of sport presentation and showcase for the the resort as an Olympic Venue.
- ❑ There is a need to compare and contrast the past Olympic course and venues
- ❑ Technical Assessment with topographic mapping with at least 5 meter contour intervals (preferably 1 or 2 meters intervals, which have been complied by Lidar data scan or stereoscopic aerial photography.
- ❑ Slope Inventory with color coded maps showing the different slope gradients.
- ❑ To produce a General Plan Concept which consider the pre-game operations, Olympic Operations and post Game operations so the venue so the site can be commercially and economically viable resort.

# DESIGN REQUIREMENTS

- ❑ To prepare a conceptual design based upon practical, integrated solutions that are cost-effective, user-friendly, constructible, and operable.
- ❑ To ensure planning and development process - from concept through implementation - ensures that the partners obtain achievable and profitable results.
- ❑ To consider the environmental aspects of the location and to optimally position the course with weather considerations.
- ❑ To review the Solar and Slope Gradient study
- ❑ To consider the Legacy Development in the planning for the course and future ski area.

# STADIUM DESIGN PRINCIPLES

- ❑ **FIS Course Specifications** are the **design standards** (not the averages but the higher ranges for the Olympics)
- ❑ Consideration of the **weather protection** from the prevailing winds
- ❑ Every 'spectator seat' / 'spectator standing' position needs to have **direct line of sight** to the competition course
- ❑ Every seat or standing position needs to have **direct line of sight to video wall** and scoreboard
- ❑ The 'hot box' or 'wedge' (where the finalists are lined up) needs to have a direct line of sight to the scoreboard
- ❑ All courses need to allow **machine access** from both sides

# STADIUM DESIGN PRINCIPLES

- ❑ **Relationships** between the **standing spectators** and the **seated spectators** needs to be balanced
- ❑ An '**intimate atmosphere**' is designed for the 'fans' and 'athletes'
- ❑ There will be several **Finish Zones** with different **Finish Areas**.
- ❑ **Lighting** for night time competitions, provides more **scheduling** opportunities
- ❑ **Post Games considerations:** FIS is interested in having a 'world class' stadiums to stage World Cups And World Championships beyond the Games



# DESIGN OF COURSES AND FINISH AREA

- ❑ Generally MO, AE and HP competitions will be staged **at night under the lights.**
- ❑ **Night competitions** has been the case for **Moguls** and **Aerial** for the Torino 2006, Vancouver 2010 and Sochi 2014 & PheongChang 2018 and **HP** for Vancouver 2010 and Sochi 2014.
- ❑ **MO, AE and HP**, is a total of **8 events** (40% of the program), were all staged as night events in **Sochi 2014**
- ❑ Different ingress and egress access points need to be designed into each course for TV installations, Snow Grooming Equipment and Competition Officials.

# FINISH AREA DESIGN

- ❑ **SX, SBX and PGS** competitions are staged during the day.
- ❑ **Start Area** for **Cross, PGS** needs a flat area of 200-300m<sup>2</sup>
- ❑ **SBX** and **SX** are best suited for undulated terrain. They share the same **start** and **finish area** but have different centerlines.
- ❑ **SBX** and **SX** share the same, flat, **Finish Area**.
- ❑ The **SBS** and **SS** (Slopestyle) share the same **Finish Area**
- ❑ One **finish line** elevation for all courses in each **Finish Zone**.

# HALFPIPE AXIS

- ❑ **Halfpipe** need to be North Facing in a North / South Axis.
- ❑ A south facing **Halfpipe** is particularly affected by the **sun**, during the day both walls are exposed and snow melt is at a consistent rate.
- ❑ A North Facing **Halfpipe** has the better snow conditions. The sun does not effect the walls, the snow doesn't melt as fast and the wall stay hard.
- ❑ North Facing Halfpipes with **Snow Making** provide the best conditions to build and maintain a high quality Halfpipe.

# TRAINING COURSE REQUIREMENTS

## ❑ **Training Courses** need to be defined for;

- ❑ Parallel Giant Slalom / Parallel Slalom (3 lanes x 20m wide lanes, similar profile and length the race slopes)
- ❑ Snowboard Cross and Ski Cross

## ❑ **Training Courses** for;

- ❑ Halfpipe, Moguls and Aerials training takes place on the same course as the competition.
- ❑ An additional mogul slope (200 meters @ 25 degrees) need to be dedicated near the competition course.

## ❑ **Glide Testing** Requirements

- ❑ 100m to 150m @ 20 to 25% (constant angle)

# LIFT REQUIREMENTS

- ❑ **Lifts** to service the PGS, SBX / SX and SBS / SS courses need to have **fast turn around time (Lift Line Speed: over 2.6 meters sec)** in order to run the competitions to be effectively produced for TV.
- ❑ The **HP, MO, AE and BA** require medium to fast lifts. This lift needs to **minimize the skiing time to top of each course**. This could be a surface lift.
- ❑ **Upload and Download** requirements may be needed to provide access for different services.

# FIELD OF PLAY

## Course Specifications and Technical Requirements



# FIS FREESTYLE SKIING AND FIS SNOWBOARD COURSE SPECIFICATIONS

- ❑ The **FIS Course Specification** for Snowboard and Freestyle Skiing are well defined in terms of Vertical Drops, Lengths, Widths and Slope Angles in the respective **Disciplines ICR and Course Specifications**.
- ❑ **All drawings and concepts** must show the related competition **Technical Infrastructure**; **Judges Stands** for MO, AE, HP SS/SBS and **Timing Building** for SX, PGS / PSL and SBX. All drawings need show the respective **Start Areas** and **Finish Areas**.
- ❑ In the some cases, there are **Olympic Specifications**

# FIS COURSE CRITERIA FREESTYLE SKIING AND SNOWBOARD DISCIPLINES

Event	Course Area (m2)	Vertical Drop	Length/Width
<b>Mogul Course MO</b>	7000 m2	120 m	250m @ 27° x 30m
<b>Aerial Course AE</b>	5000 m2	50 m	170m x 30m
<b>HalfPipe HP</b>	5000 m2	65 m	170m @ 18° x 40m
<b>Parallel PGS</b>	20,000 m2	170 m	550m x 40m
<b>Cross SBX / SX</b>	25,000 m2	215 m	1200m x 30m
<b>Slope SBS / SS</b>	22,500 m2	175 m	600m @ 15° x 30m
<b>Big Air BA</b>	5000 m2	50 m	170m x 30m
<b>Total</b>	100,000 m2		



# START ZONES AND START AREAS

- ❑ Each **Start Area** needs to have a flat space of at least **150m<sup>2</sup> to 300m<sup>2</sup>**.
- ❑ Two sections are required, one separate **Start Area** 100 m<sup>2</sup> and one **Competitor / Team Preparation Area** 100m<sup>2</sup> to 200m<sup>2</sup>.
- ❑ **Equipment Preparation Area** in some events needs to be an additional **100-200m<sup>2</sup>**
- ❑ There needs to be fixed (easy) ski runs or trails from the top of the ski lift to the **Start Zones** and **Start Areas**.

# SHARED FINISH ZONES AND FINISH AREAS

- ❑ More than one event must end in each **Finish Zone**.
- ❑ **Finish Areas** area are at 0 degrees (flat).
- ❑ **Finish Area** = 25 meters wide by 30 meters long for MO, AE, HP and BA.
- ❑ **Finish Areas** needs to be 30 meter wide x 60 – 70 meters long @ 0 degrees for Parallel, Cross and Slope events.
- ❑ **Technical space** in between courses of 8 to 10 meters



# EXIT GATES

- ❑ The **Exit Gate** is the final location where the athletes leave the course and then enter into the **Mixed Zone**.
- ❑ Technical wedges, backdrops and photographic zones are set up just around the **Exit Gate**.
- ❑ The angle of the **Exit Gate** and the location of the **Interview Wall** are a function of the location of **Video Wall**.
- ❑ **Technical Exits** are located on each course which are above or between the **Finish Line** and the **Exit Gate**.

# SNOWMAKING REQUIREMENTS (Sochi 2014)

COURSE	COURSE SNOW (m <sup>3</sup> )	+ MELTING FACTOR (m <sup>3</sup> )
PGS	26,000	39,000
SX / SBX	71,500	107,200
SS / SBS	51,000	76,500
HP	30,000	40,000
AE	11,000	16,500
MO	24,000	35,000
BA	11,000	16,500
Access Roads	45,000	65,000
Training Slopes	25,000	39,000

# SNOW REQUIREMENTS

- ❑ **Base Snow Requirement**, minimum 1m including **access slopes** and **technical roads**.
- ❑ **Finish Areas** min 1 m - max 1.5 m is the upper limit of snow to define a “zero level” to design the overlay structures
- ❑ **Profile snow requirement**: it has to be defined based on the **course design**. It is possible to define a minimum and a maximum volume of snow for MO - AE - BA - HP - PGS - PSL, but not an accurate value, because it depends on **ground profile**.
- ❑ **Snow Melting / Compression Factor**: 1.2 - 1.3 coefficient is used to calculate the final snow volume. With unfrozen ground, 1.2 - 1.3 means that 0,6 – 0,8 cm per day, about 20/30 cm of snow could melt over 1 m of snow depth overall.

# SNOW GROOMING EQUIPMENT

COURSE	MACHINE TYPE	REMARKS
<b>SLOPESTYLE</b> (SBS / SS)	2 winch park 1 snow blower for groomer. *	1 snow blower for groomer. ** Cleaning capacity > 1.000 T/hr Prinoth / Pisten Bully attachments
<b>CROSS</b> (SX / SBX)	1 park 3 park 1 winch park	1 snow blower for groomer. ** Cleaning capacity > 1.000 T/hr Prinoth / Pisten Bully attachments
<b>AERIALS (AE)</b> <b>MOGULS (MO)</b> <b>BIG AIR (BA)</b>	1 winch park 1 snow blower for groomer . * 1 park	1 snow blower for groomer . * * Cleaning capacity >1.000 T/hr Prinoth / Pisten Bully attachments
<b>HALFPIPE (HP)</b>	2 winch park 1 snow blower for groomer * 1 park	1 snow blower for groomer * * Cleaning capacity “:> 1.000 T/hr Ejection Distance: > 25 meters 2 pipe grooming attachments 22ft ** ** Prinoth / Pisten Bully attachments
<b>PARALLEL</b> <b>PGS</b>	1 winch	
<b>TRAINING AND OTHER</b> <b>SLOPES</b>	2 winch 2 park	

# TRANSPORTATION & LOGISTICS

<b>EXTRA MACHINES</b>	1 excavator 4T; 1 excavator 20T or 1 spider excavator; 2 telescopic forklifts	Excavators equipped with tracks Forklift: min load capacity 4.000 kg
<b>TRANSPORTATION</b>	2 snow cat* *blade should have minimum 1 ton capacity 1 cabin snowcat – also small one	1 groomer equipped with crane. Accessories required for basket 1 hydraulic forklift 4 forklifts to attach to the blade 5 baskets to attach to the blade 2 sledges / trailers
<b>SNOWMOBILES*</b>	12 snowmobiles* - 6 for transportation - 6 for competitions time	4 trailers *equipped with alarm and emergency lights system

“Winch” is a type snow grooming equipment with mechanical system with cable.

“Park” is type of grooming machines designed to work on snow-parks.

“Prinoth” is grooming machine company <http://en.prinoth.com/Snow-groomers>

“Pisten Bully” is grooming machine company <http://www.pistenbully.com/en.html>

“Zaugg” is a snow clearance and attachment company [http://www.zaugg-ag.ch/e\\_home.php](http://www.zaugg-ag.ch/e_home.php)

# ACCESS SLOPES TECHNICAL ROADS

Each **course** is surrounded by Technical roads, trails and Skiways for:

- ❑ Snowmaking and Snowmobiles
- ❑ Photographers and TV Cameraman
- ❑ Course Workers, Officials and Coaches

**Technical Roads** for snowmobiles and snowcats: width min 6 m to 10 m. Max inclination 15 degrees (25%), for snowmobiles

**Skiways:** ski access/ pedestrian access: min 8 m width, preferable 12 m width. Inclination average max 15 degrees (25%)

**Skiways / Access roads / pathways** in Mogul course between Air Bump 1 - Air Bump 2 - finish area Other Skiways would be needed to link access points between the courses.

**Trail** is a 2 to 3 meter wide track leading to and from different parts of the course.



# WINCH ANCHORS

## MO – AE – BA:

- ❑ Winch anchor point above the starting platform
- ❑ Access for snowcats / personnel should be made behind anchors.

## HP:

- ❑ 2 winch anchors at the ground level: one per wall on the starting platform about 15m apart 7.5m each from centre line pipe.
- ❑ Installed 40 m behind/above start platform, about 15m apart 7.5m each from centre line pipe.
- ❑ Access for snowcats / personnel should be made behind anchors.

## SX – SBX – SS – SBS – PGS :

- ❑ to be defined during inspection

# SPORT INFRASTRUCTURE



# TECHNICAL INFRASTRUCTURE

This is a list of the Technical Infrastructure requirements;

- ❑ **Timing Buildings** - for PGS, SX / SBX
- ❑ **Judges Stand** - Halfpipe 3 x 10 = 30m<sup>2</sup>
- ❑ **Judges Stand** - Aerials 3 x 10 = 30m<sup>2</sup>
- ❑ **Judges Stand** - Moguls 3 x 10 = 30m<sup>2</sup>
- ❑ **Judges Stand** - Slopestyle 3 x 10 = 30m<sup>2</sup>
- ❑ **Judges Stand** - Big Air 3 x 10 = 30m<sup>2</sup>
- ❑ **Timing and Scoring**
- ❑ **OVR On Venue Results**
- ❑ **Team Captains Meeting Room(s)**
- ❑ **IF Offices and IF Lounge(s)**
- ❑ **Sport Presentation**

# LIGHTING REQUIREMENTS

- ❑ All lighting installations need to be on the outer site of the **Stadium** and not be placed between the spectators and the **FOP**
- ❑ **3 Lighting Levels:**
  - ❑ **Level 1** Technical Lighting; basic lighting
  - ❑ **Level 2** Construction Lighting; used to construct the courses
  - ❑ **Level 3** TV Lighting; Training / Competition (**OBS = 2000 LUX**)
- ❑ **Level 3**, competitions lights have to all at the same time
- ❑ **AE & BA**: additional horizontal lights on the landing
- ❑ Flicker free system is needed for **AE, BA** and **HP**
- ❑ Other Lighting Requirements
  - ❑ **Access slopes** from lifts to competition slopes: **min 70 LUX**
  - ❑ Other courses / **technical roads** for day events: working lights permanent or portable ones.

# VIDEO WALLS, SCOREBOARDS & SPORT BOARDS

- ❑ There will be one **Video Wall** per **Finish Zone** or Stadium
- ❑ The location of the **Video Wall** has to be fixed once the finish area is set. This will determine which **side of the course** where the **Exit Gate** located.
- ❑ The size of the **Video Walls** are determined by supplier
- ❑ **Viewing Angle of the Video Walls** must be correct for spectators, **athletes** and **Sport Presentation**
- ❑ **Scoreboards** are located next to **Video Walls** and **Sport Boards** are located at **Exit Gates**.

# MIXED ZONE REQUIREMENTS

The Mixed Zone is a media gauntlet that athletes have to pass through as soon as they're finished their performances, or runs.

- ❑ **“Rights Holding Broadcaster/Rights Holder”** means a corporation who has been granted the right to broadcast the Olympic Games in a particular territory.
- ❑ **“Bona Fide News Organisation”** is an organisation which provides news services as one of its services or as it's only service.
- ❑ **“E Accredited Media”** means written press, photographers and other Non-Rights Holders who have been accredited to report on the Olympic Games.
- ❑ **“Non-Rights Holder”** means broadcast media organisations who have not been granted the right to broadcast the Olympic Games in a particular territory.

# SPORT PRESENTATION

- ❑ **Sport Presentation** Facility needs to have full view of the **Course, Finish Area, Score Board** and **Video Wall**.
- ❑ **Sport Presentation** be located near the **OVR** and **Finish Area**
- ❑ **Sport Presentation** integrates the **Sound System, Announcers** and controls the additional items on the **Video Wall** and at times may have control over the **Scoreboard**.

# PUBLIC ADDRESS / SOUND SYSTEM

- ❑ **Sound Overlay** is a key element of the **Sport Presentation** of the competitions.
- ❑ **Sound Level** requirements are set by different locations, **Spectator Stands** and **Finish Area** need to be adequate whereas on the **courses** generally there is very limited.
- ❑ Sound levels need to be provided at the **Start Area** and **Finish Area**
- ❑ Several **events** need for a local sound system to operate the competition like in **Aerials** and **Big Air**



# CABLING REQUIREMENTS

- ❑ **Timing Cables** and **timing pedestals** need to be located at the **start and finish areas** and along several positions along the **courses**.
- ❑ Temporary **TV Cables** from **OBS** cover the all locations course from the top to the bottom.
- ❑ **Trenching, Conduits** and **Cable bridges** are need when the cables cross courses.
- ❑ **Technical roads** and **Skiways** are needed to support the laying of the cables.

# WAXING ROOMS

The IOC has established Standard Requirements for **Waxing Rooms**, by size and number. Please refer to this standard from the IOC.

- ☐ Single wax cabins are to be located close to the athlete lounge inside the security perimeter.
- ☐ The cabins need to be lockable, heated and ventilated, and have electricity.
- ☐ Size: 15 sq.meters (6.0m x 2.5 m).
- ☐ Each cabin will contain one clothes hanger, one table, two chairs, two chord extensions (3 m each)
- ☐ one brush and scoop upon delivery.

Location(s) of these Waxing Rooms is an important design consideration

## Table of Wax Cabins from Sochi 2014

Discipline	Quota 2014	Estimated # of NOCs	NOC Cabins	SRS Cabins	Total Cabins	m2 / Athlete
Freestyle Skiing	282	27	43	4	<b>47</b>	2.50
Snowboard	252	27	39	0	<b>39</b>	2.32

# SPECTATOR STANDS

- ❑ Equal numbers of spectators needs to be set for each **Stadium / Finish Zone**.
- ❑ From the end of the Finish Area, (30 to 70 meters from the finish line) to the front edge of the spectator stands should be 25 to 30 meters away.
- ❑ This creates an intimate atmosphere between the spectators / TV and the competitors and coaches.



# MOGULS

## TECHNICAL CRITERIA

Vertical Drop: 100m ± 25m

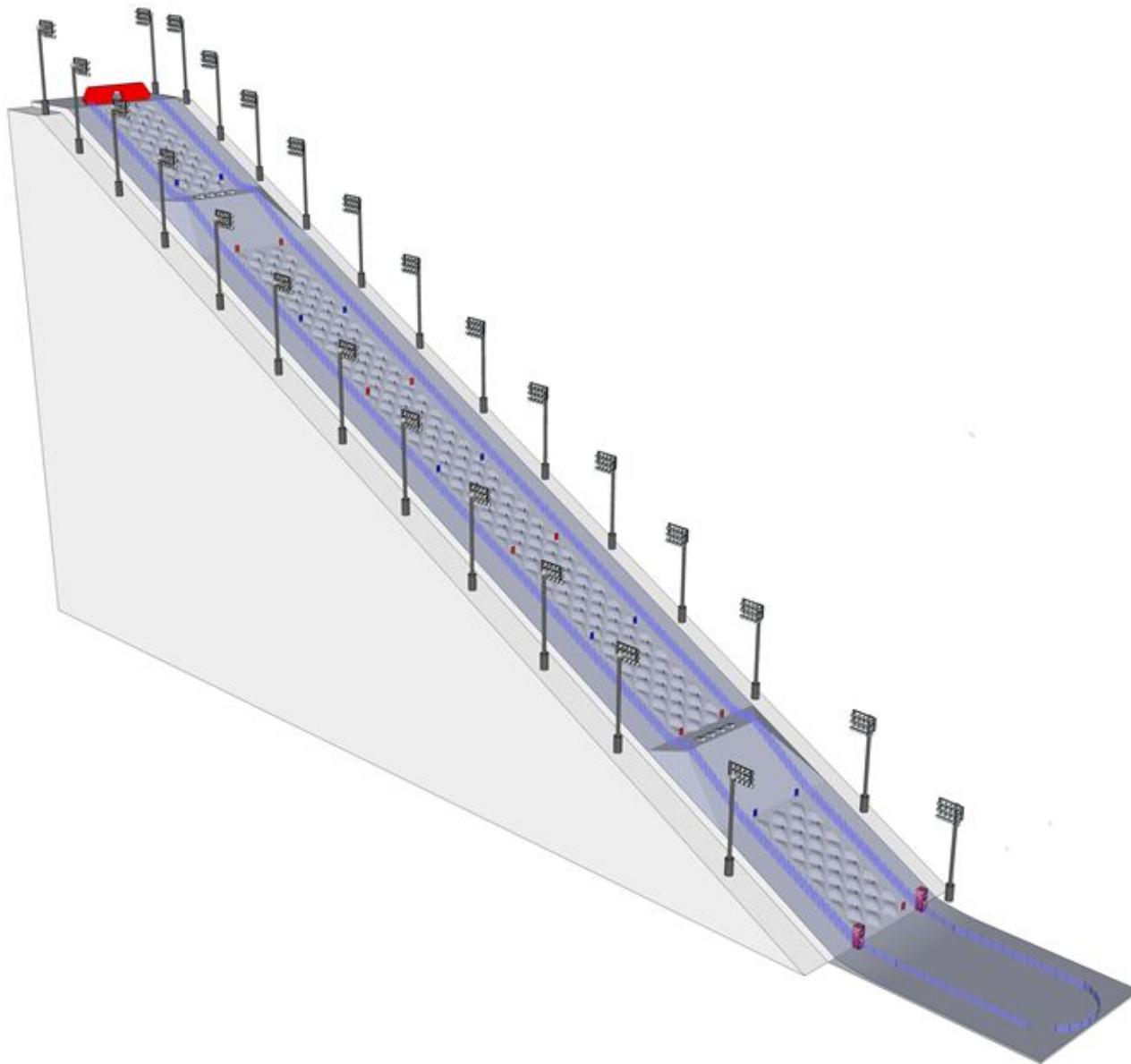
Course length: 225m ± 25m

Slope: 54%

Width: 25m

Finish Area: 30m x 30m @0

Surface Area: 6,000 m<sup>2</sup>



# AERIALS

## TECHNICAL CRITERIA

Vertical Drop: 50m ± 5m

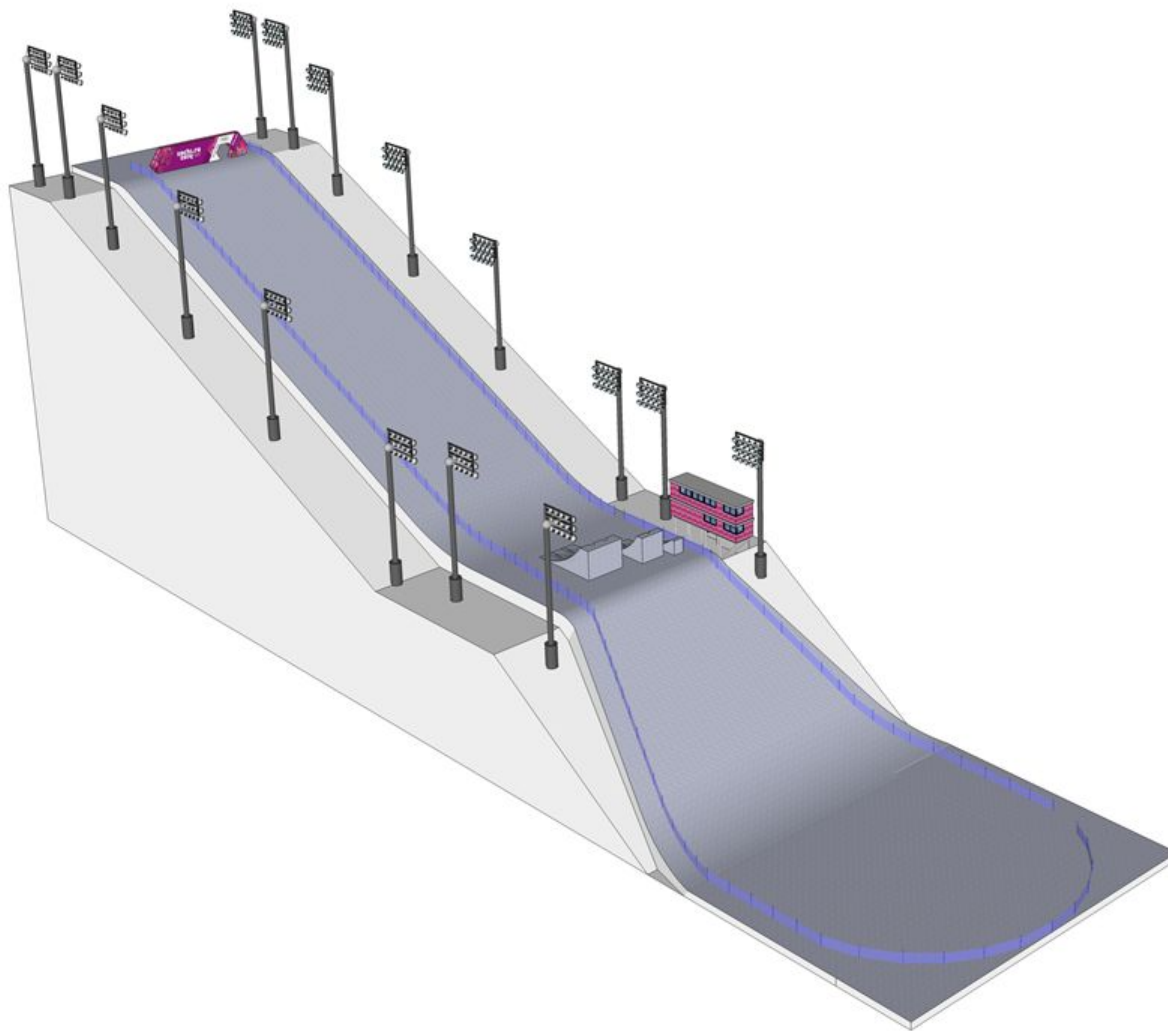
Course length: 125m ± 10m

Slope: 30%

Width: 25m

Finish Area: 30m x 30m @0

Surface Area: 3,000m<sup>2</sup>



# HALFPIIP

## TECHNICAL CRITERIA

Vertical Drop:  $45\text{m} \pm 5\text{m}$

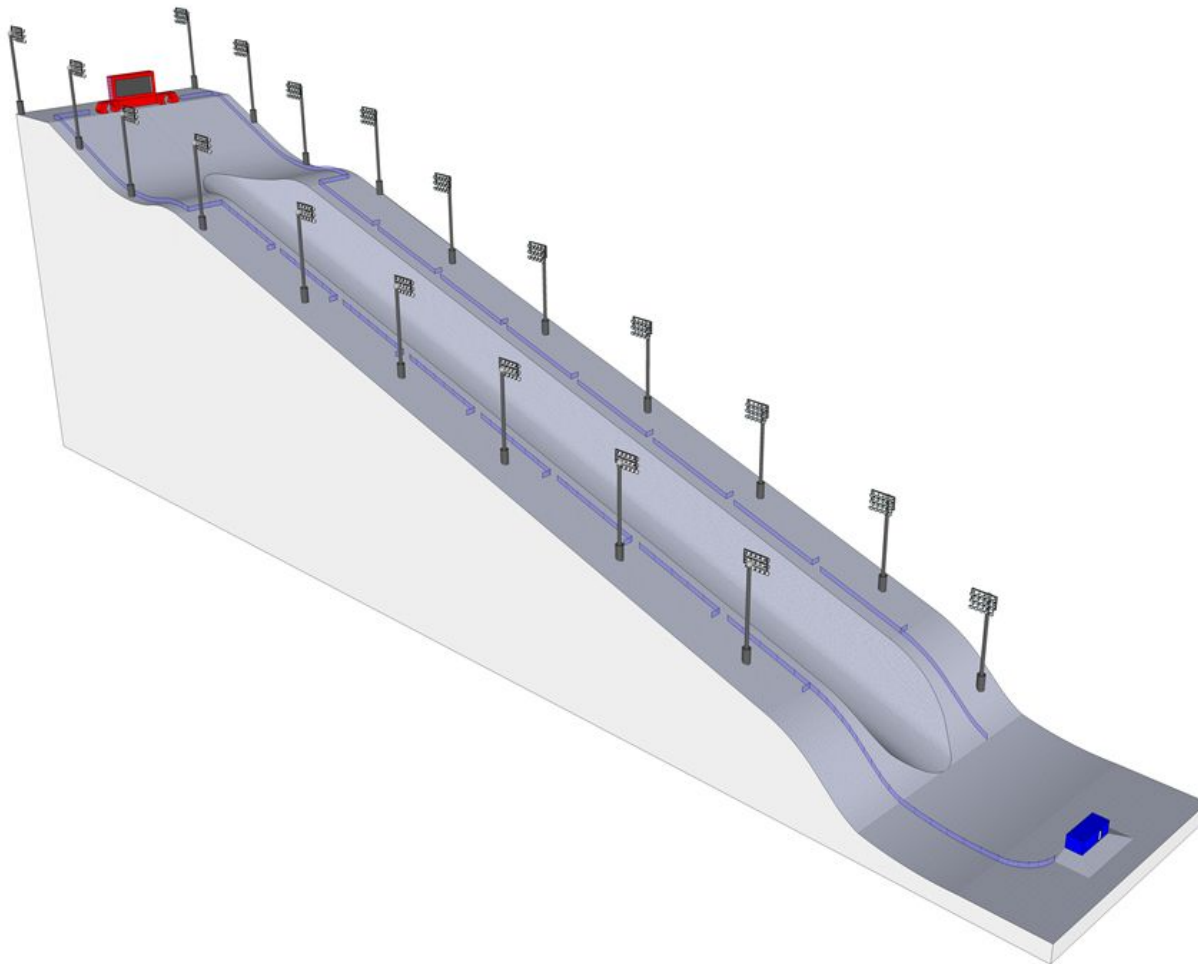
Course length:  $175\text{m} \pm 20\text{m}$

Slope: 30%

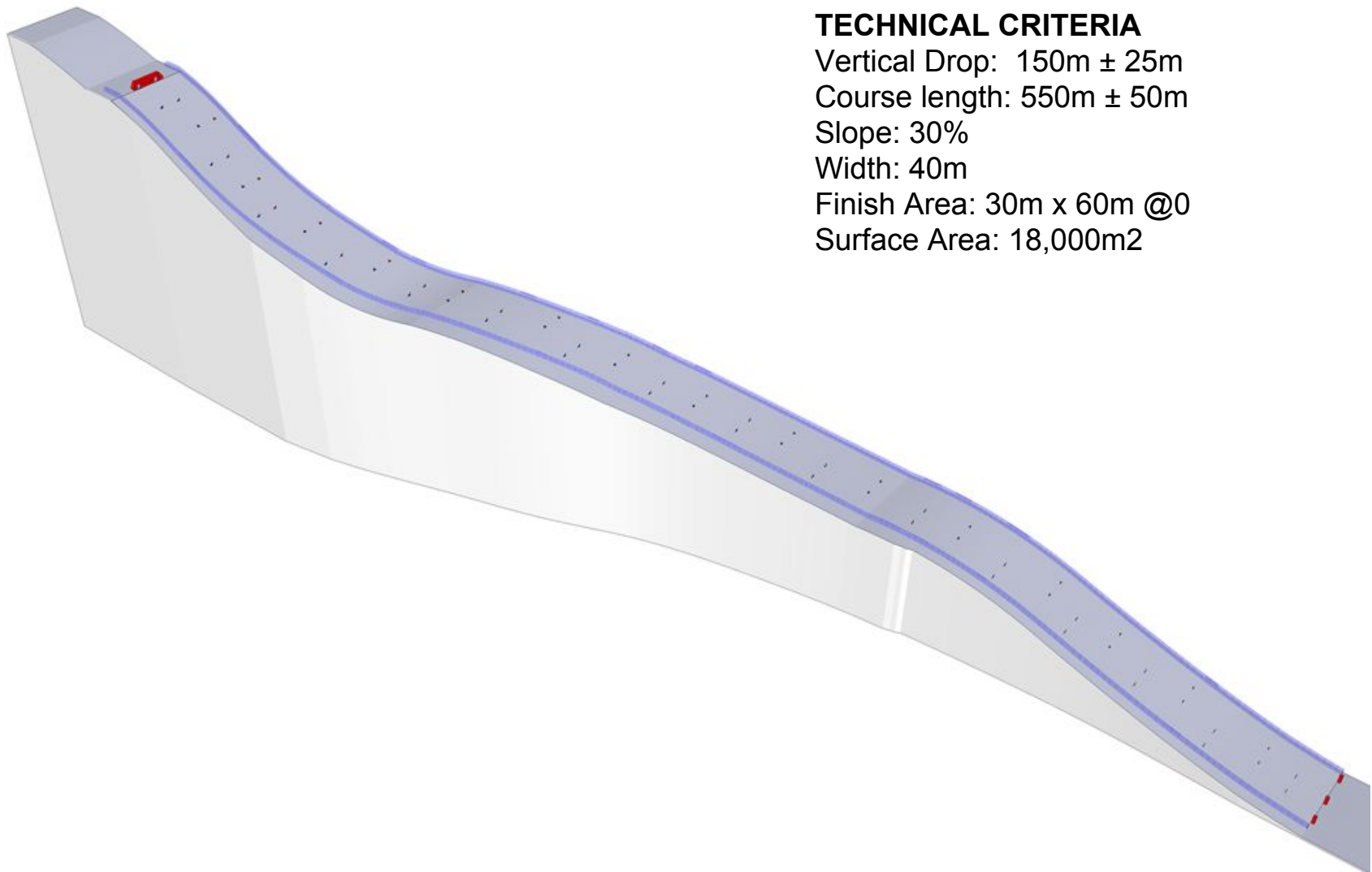
Width: 25m

Finish Area:  $30\text{m} \times 30\text{m}$  @0

Surface Area:  $3,500\text{m}^2$



# PARALLEL



## TECHNICAL CRITERIA

Vertical Drop:  $150\text{m} \pm 25\text{m}$

Course length:  $550\text{m} \pm 50\text{m}$

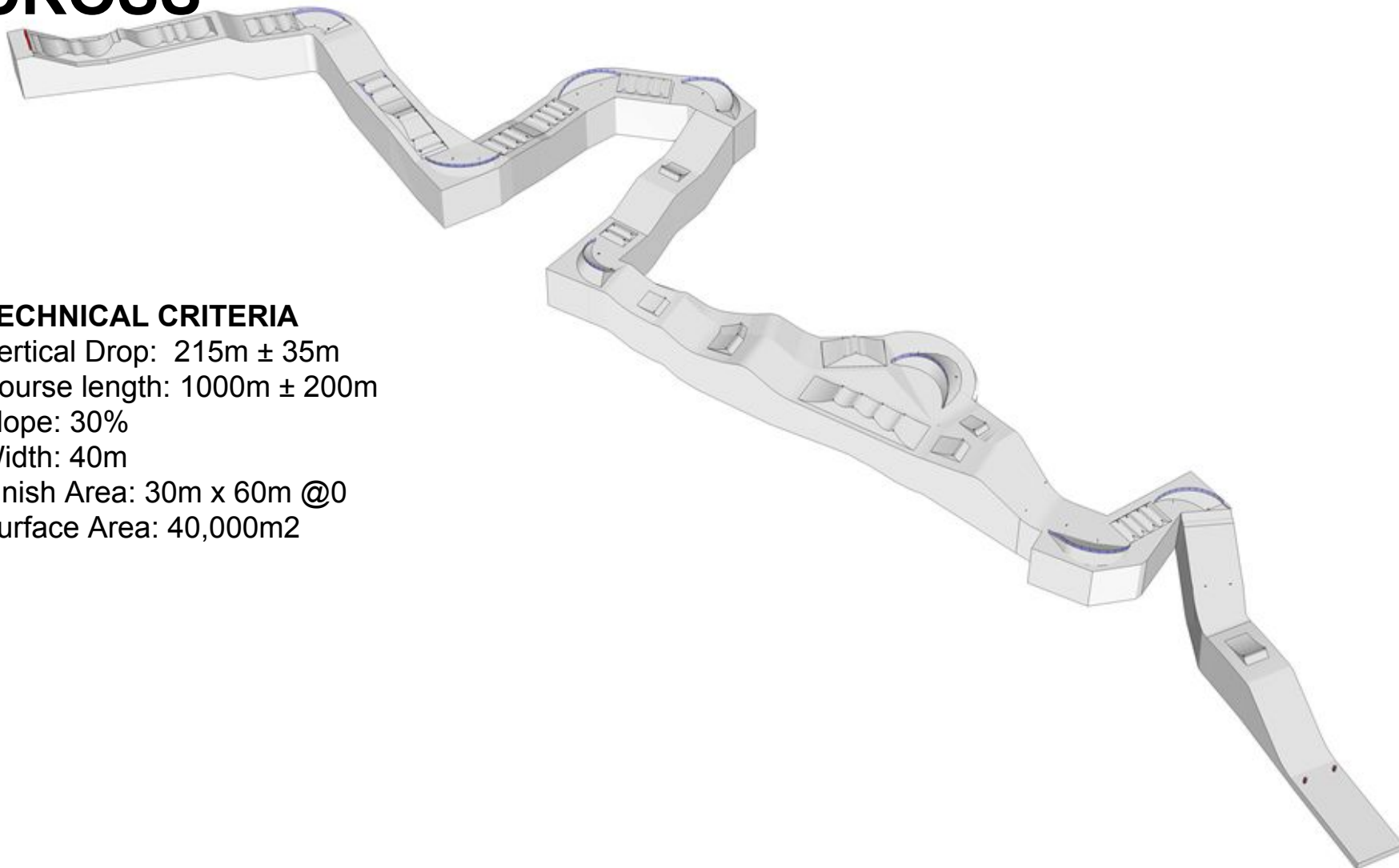
Slope: 30%

Width: 40m

Finish Area:  $30\text{m} \times 60\text{m}$  @0

Surface Area:  $18,000\text{m}^2$

# CROSS



## TECHNICAL CRITERIA

Vertical Drop: 215m  $\pm$  35m

Course length: 1000m  $\pm$  200m

Slope: 30%

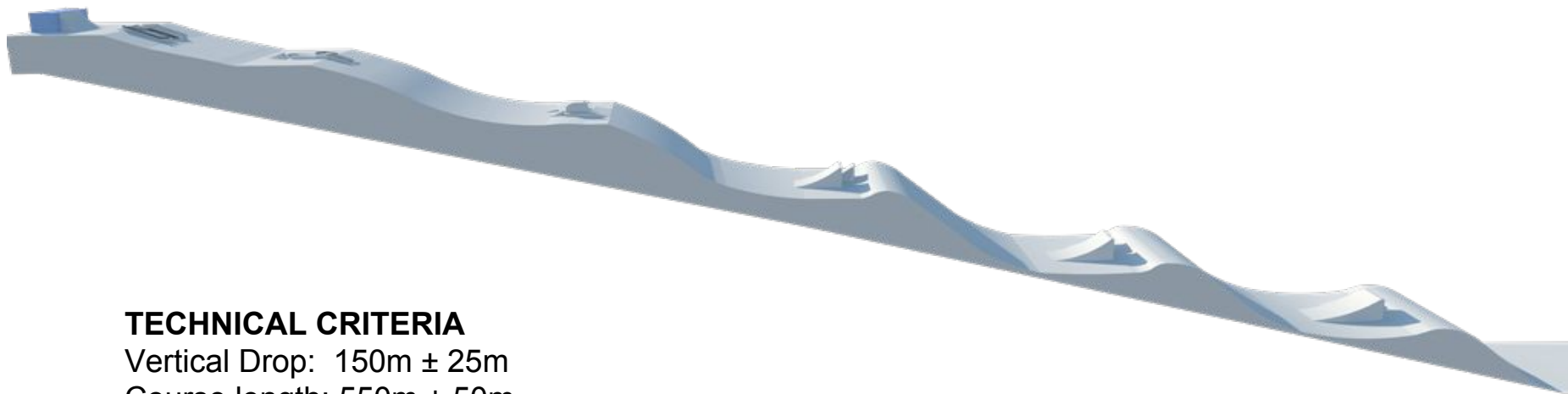
Width: 40m

Finish Area: 30m x 60m @0

Surface Area: 40,000m<sup>2</sup>



# SLOPESTYLE



## TECHNICAL CRITERIA

Vertical Drop: 150m  $\pm$  25m

Course length: 550m  $\pm$  50m

Slope: 25% to 30%

Width: 40m

Finish Area: 30m x 60m @0

Surface Area: 18,000m<sup>2</sup>

# Big Air

## TECHNICAL CRITERIA

Vertical Drop: 45m  $\pm$  5m

Course length: 150m  $\pm$  25m

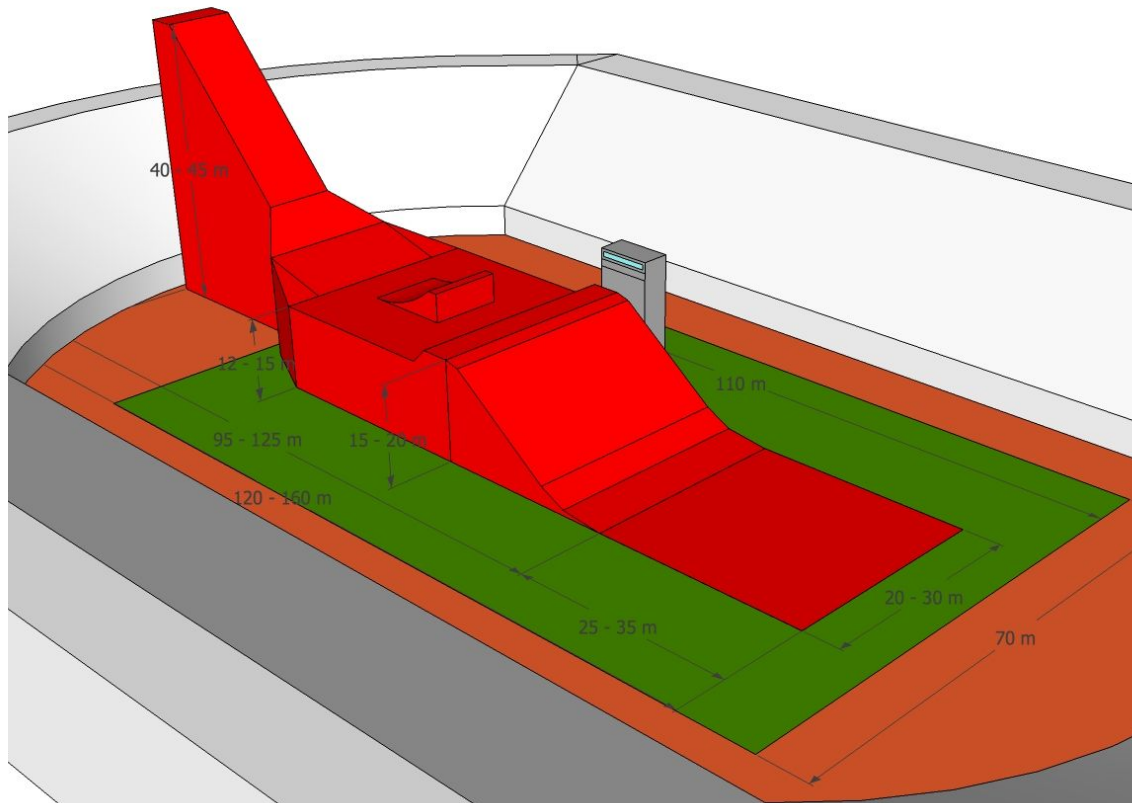
Slope: 30%

Width In-Run: 6-8m

Width Landing: 20m

Finish Area: 30m x 30m @0

Surface Area: 3,000m<sup>2</sup>



# Contact Information

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