



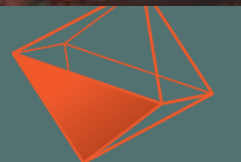
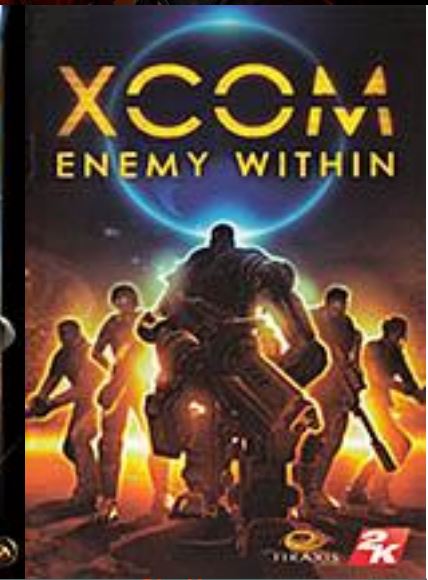
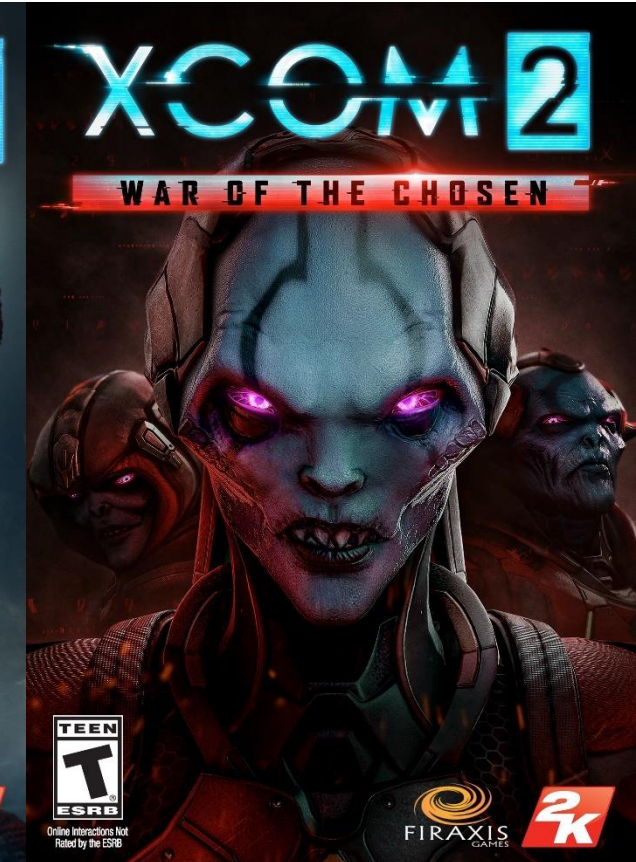
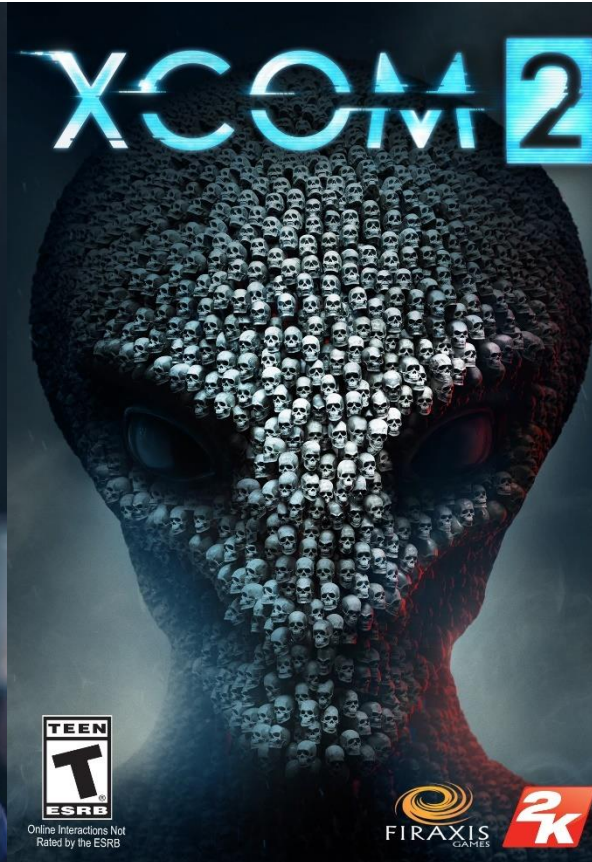
Plot and Parcel

Procedural Level Design in XCOM 2

Brian Hess
Lead Level Designer, Firaxis Games



Who am I?





Talk Outline

- History of XCOM
- Development of procedural system
- Procedural Tools
- Challenges during production
- Extending this system in the expansion
- Recap





What is XCOM?

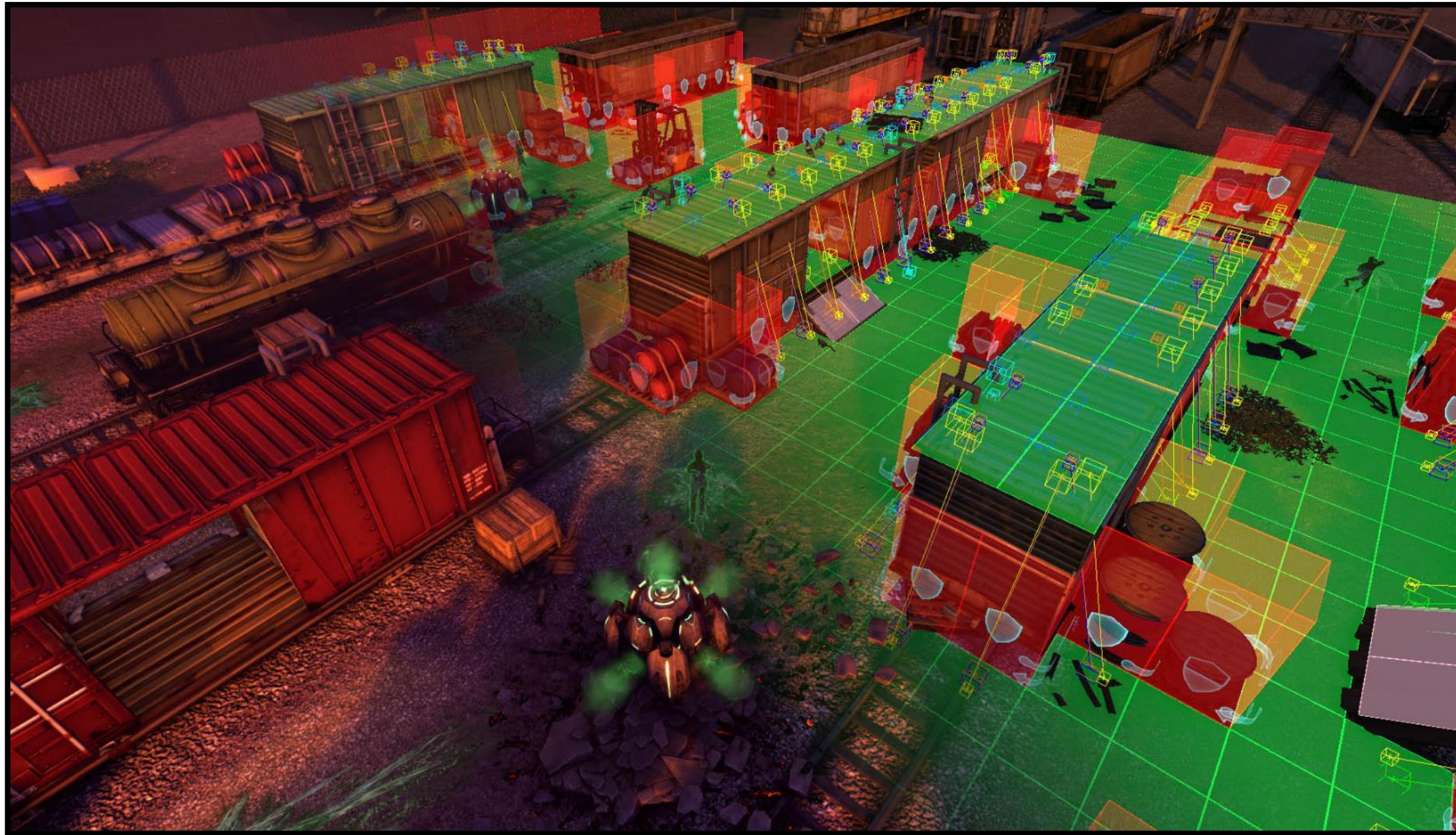
- Tactical Strategy Game
- Franchise started in 1993
- This talk is about the Firaxis XCOM titles
 - More specifically, the tactical combat portion
- XCOM is a game about hiding behind stuff and shooting aliens

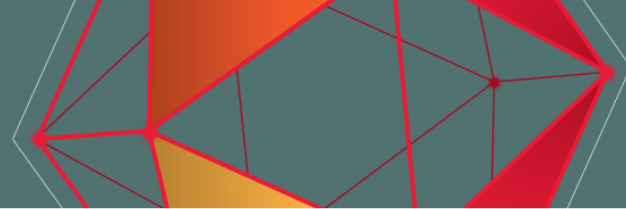




Components of an XCOM Level

- The Grid
- Cover
- Fog of War





What makes a good XCOM level?

- Object Spacing
- Cover Density
- Line of Sight

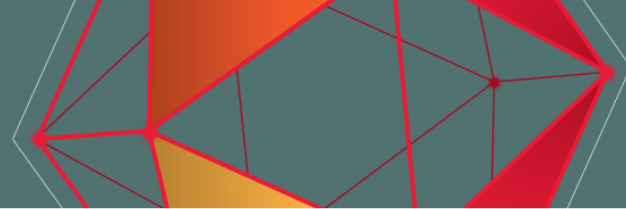




Enemy Unknown Map Analysis

- Enemy Unknown: ~80 maps
- Enemy Within: +~30 maps
 - Urban maps for Abduction missions
 - Wilderness maps for UFO missions
- Mostly custom art





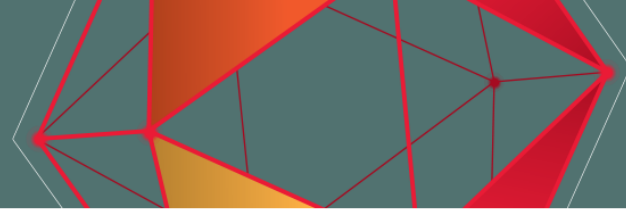
Enemy Unknown Map Feedback

- These maps are great but...
 - Super expensive
 - Not enough maps
 - Expansion / DLC maps even more expensive



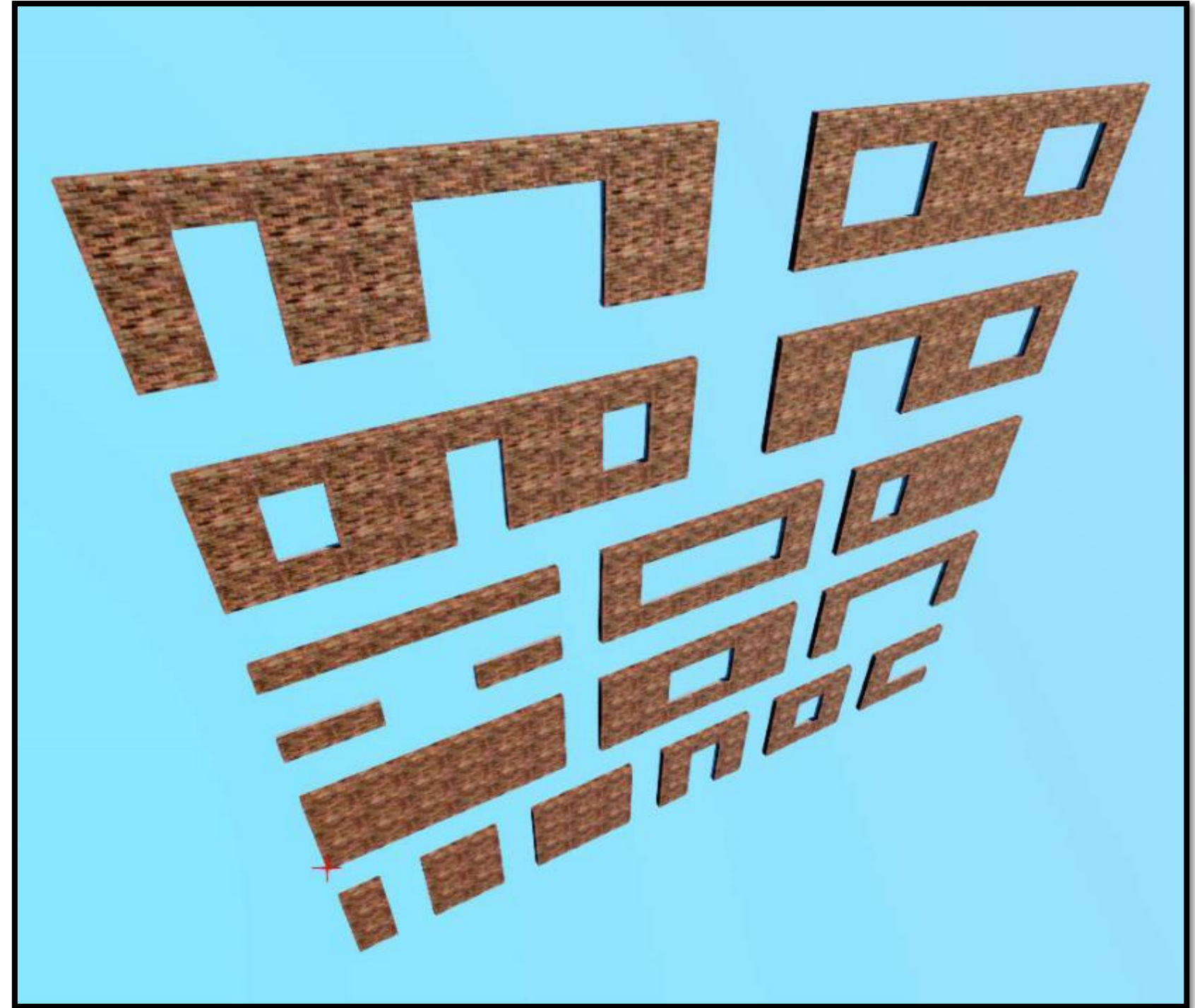
Alternate Player Starts

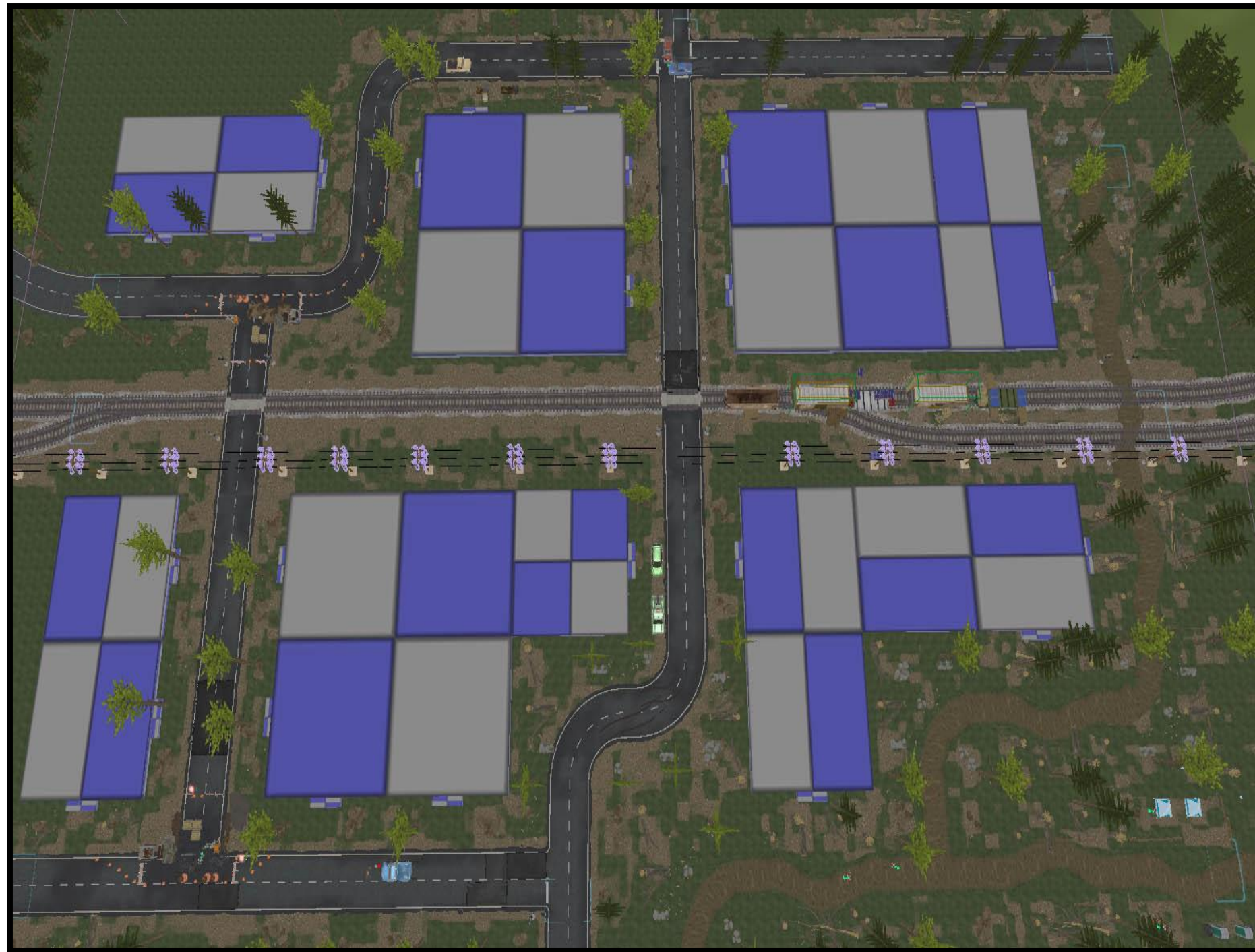
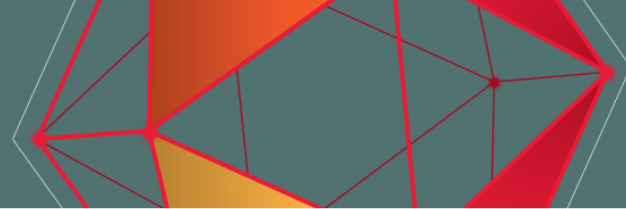




Procedural Goals

- More maps with less art
- "Play Forever"
- Modular building kits





Initial Direction

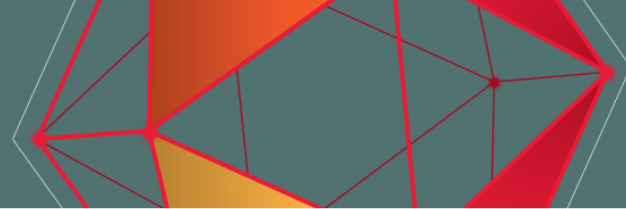
- Cut holes in static map for buildings
- Stream buildings in from separate maps
- Plot - Master layout map
- Parcels – Streamed-in buildings





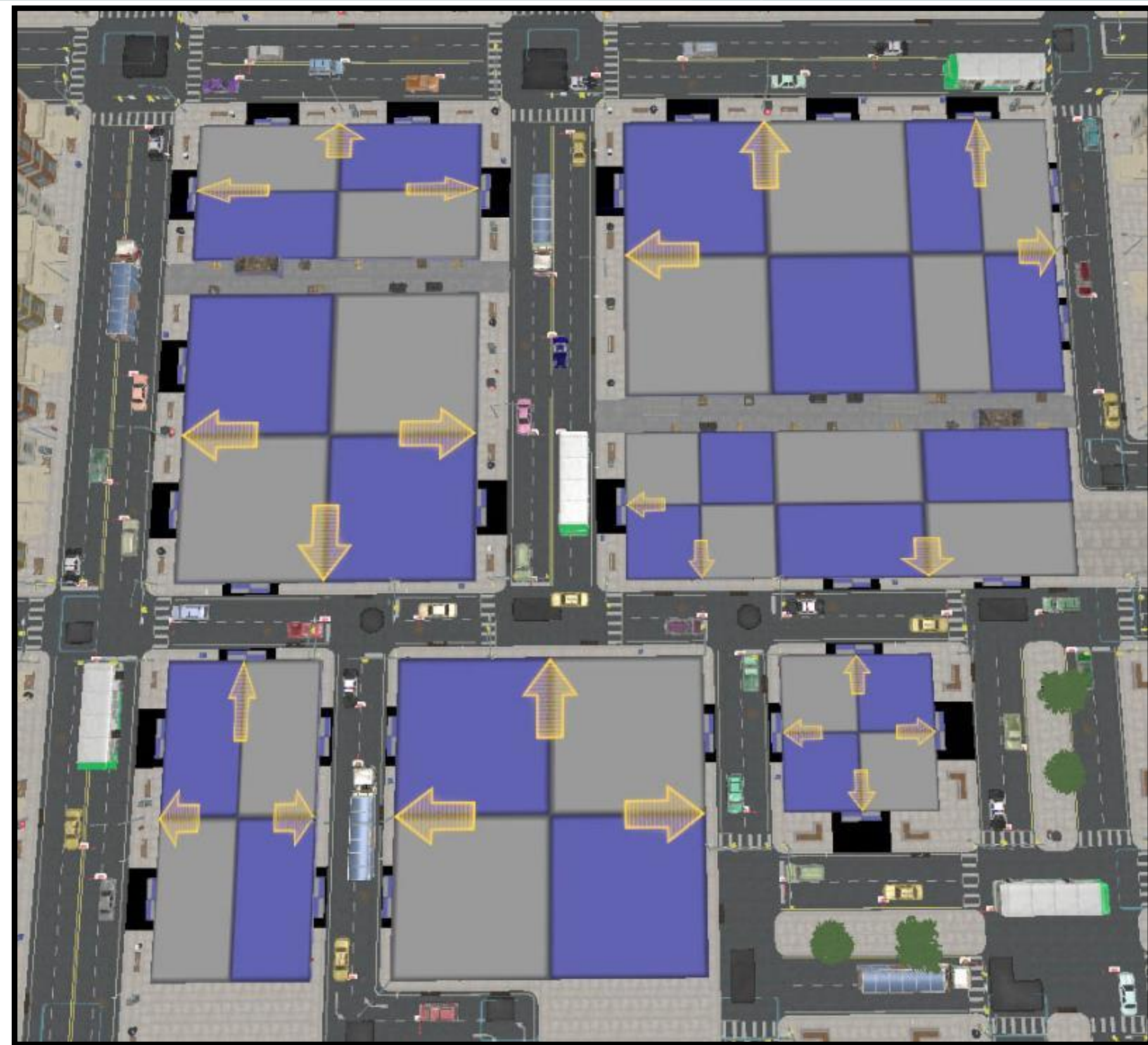
Initial Plot Types





Initial Plot Rules

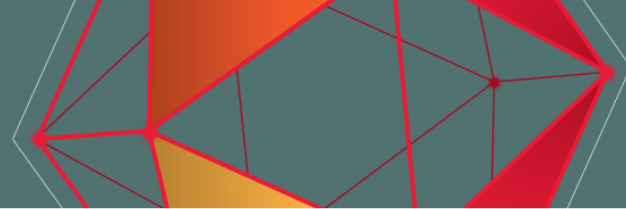
- Multiple plot types with unique visual themes
- All plots needed to support all missions
- Reinforcement support
- Large unit support



Initial Parcel Rules

- Three buckets of parcels:
 - Small parcels - 12x12
 - Medium parcels - 12x24
 - Large parcels - 24x24
- Plots had spaces for each size
- Parcels subdivide
- Parcels have a random facing

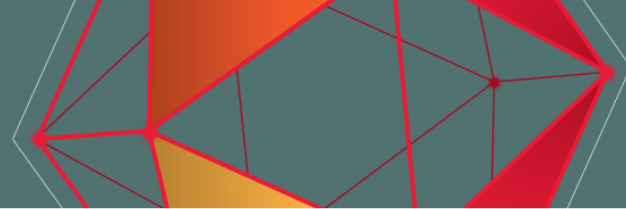




Initial Plot Evaluation

- Each plot still needed an art pass
- While buildings are the most expensive things to create
 - Still not a huge time savings
 - Maps still mostly played the same





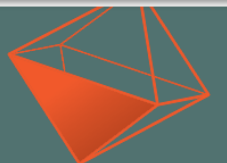
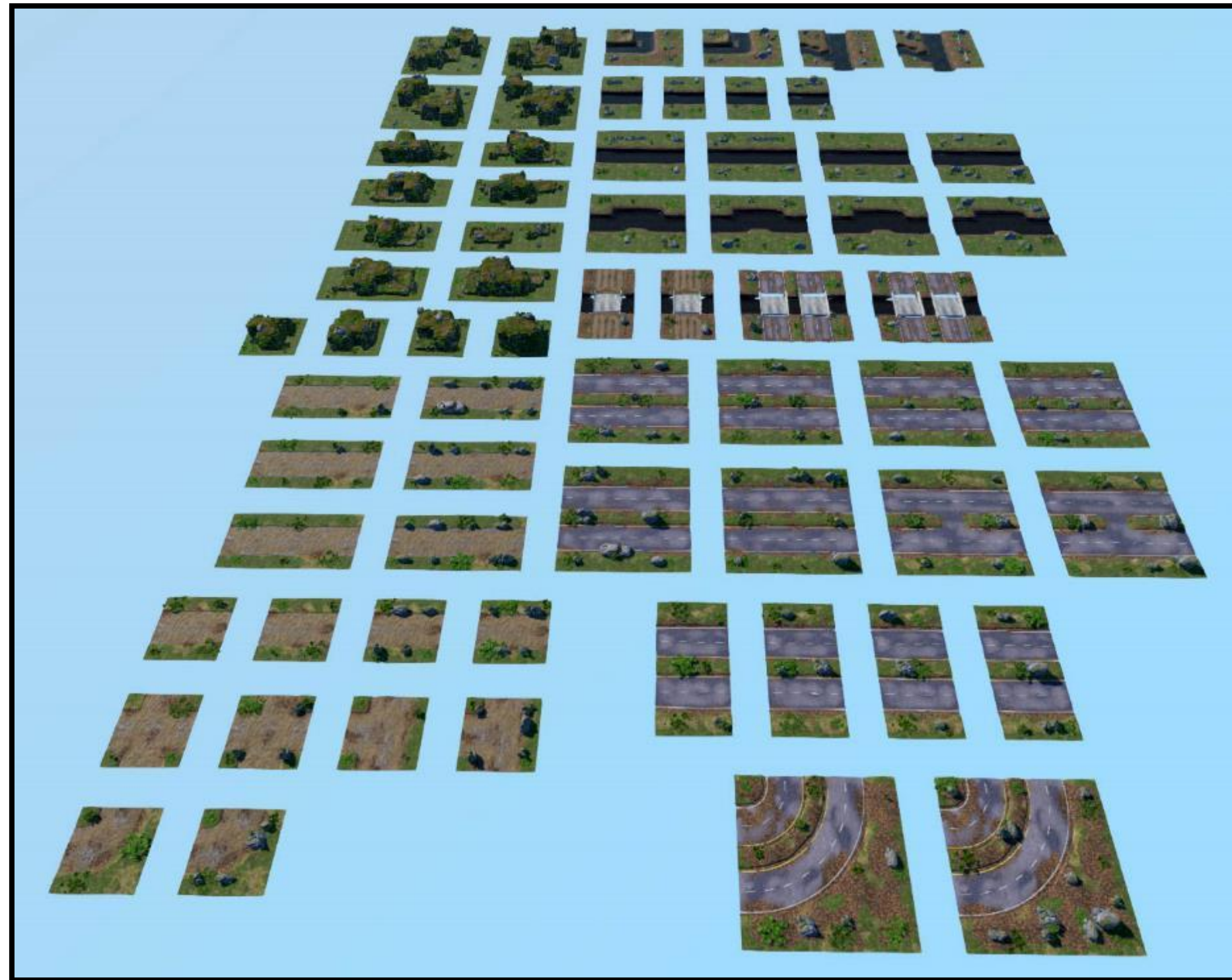
Plot Cover Parcels





Plot Cover Parcels

- Road networks converted into PCP sets
- Each piece in a set had multiple variants
- Variants were randomly selected on load





Initial Parcel Evaluation



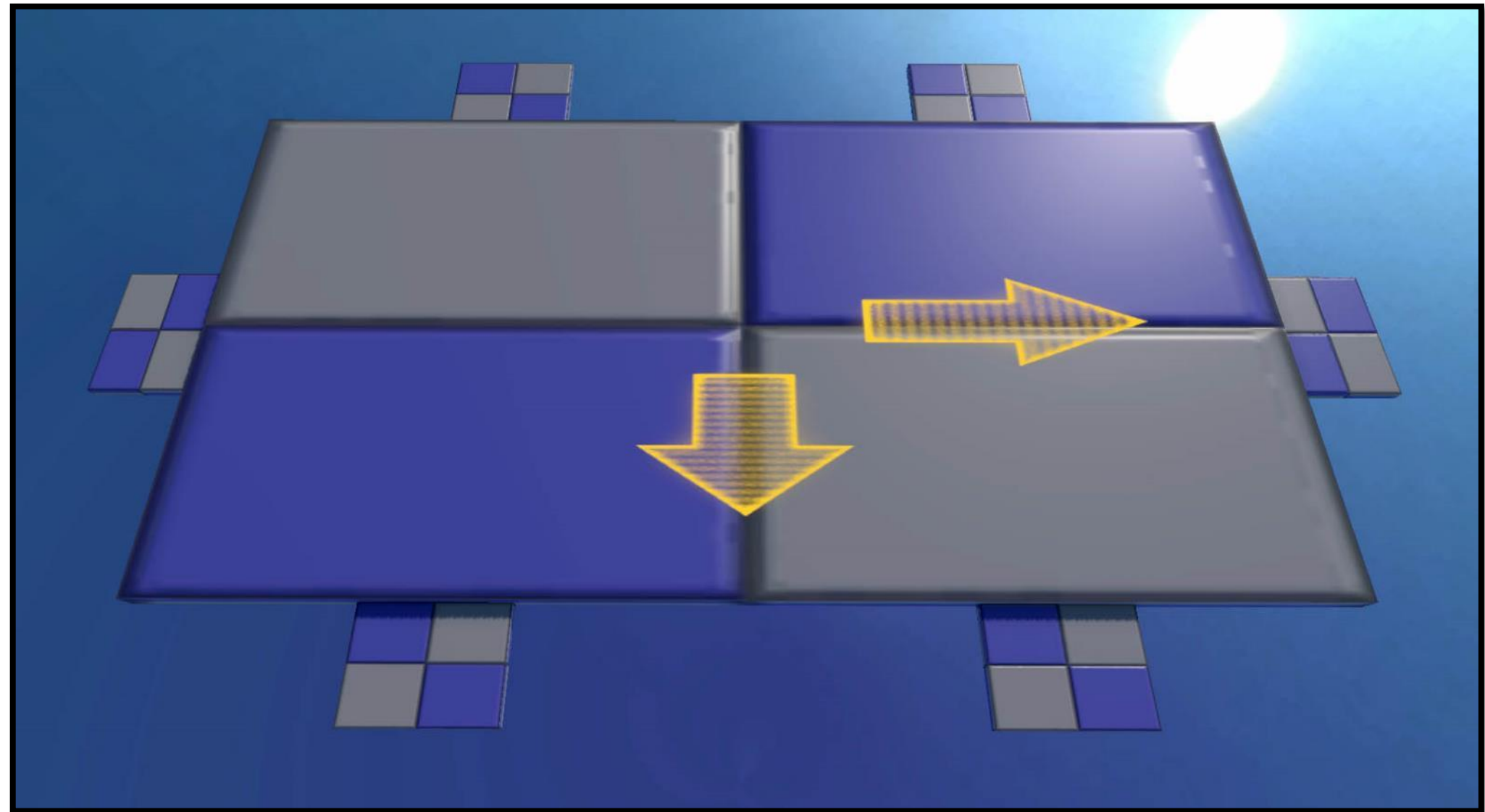
- Parcel sizes aren't big enough
- Subdivision isn't working
- Parcels needed orientation guidelines





Parcel Iteration

- Parcel Facings
- Driveways
- Zones
- Issues with variation
- Random starts





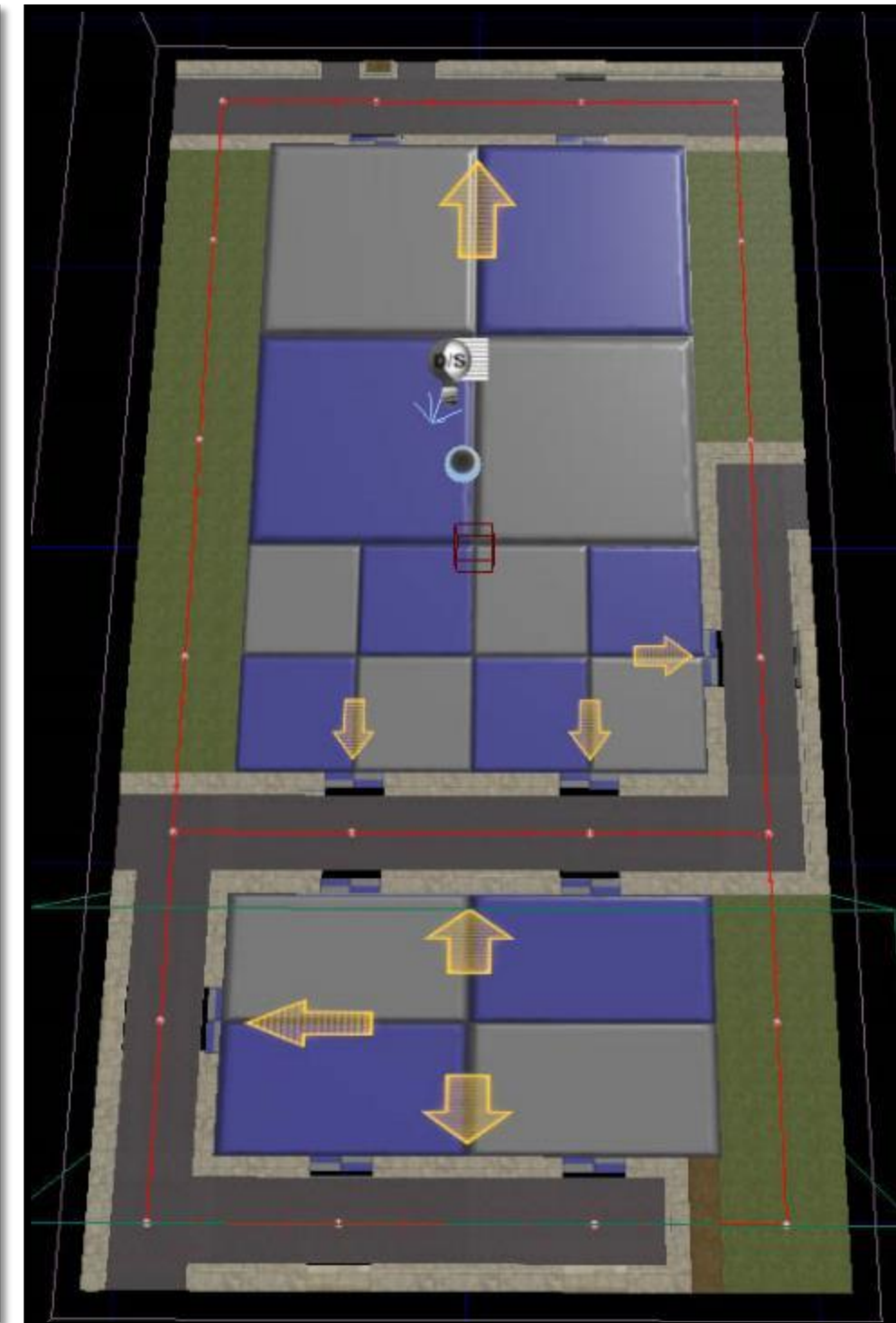
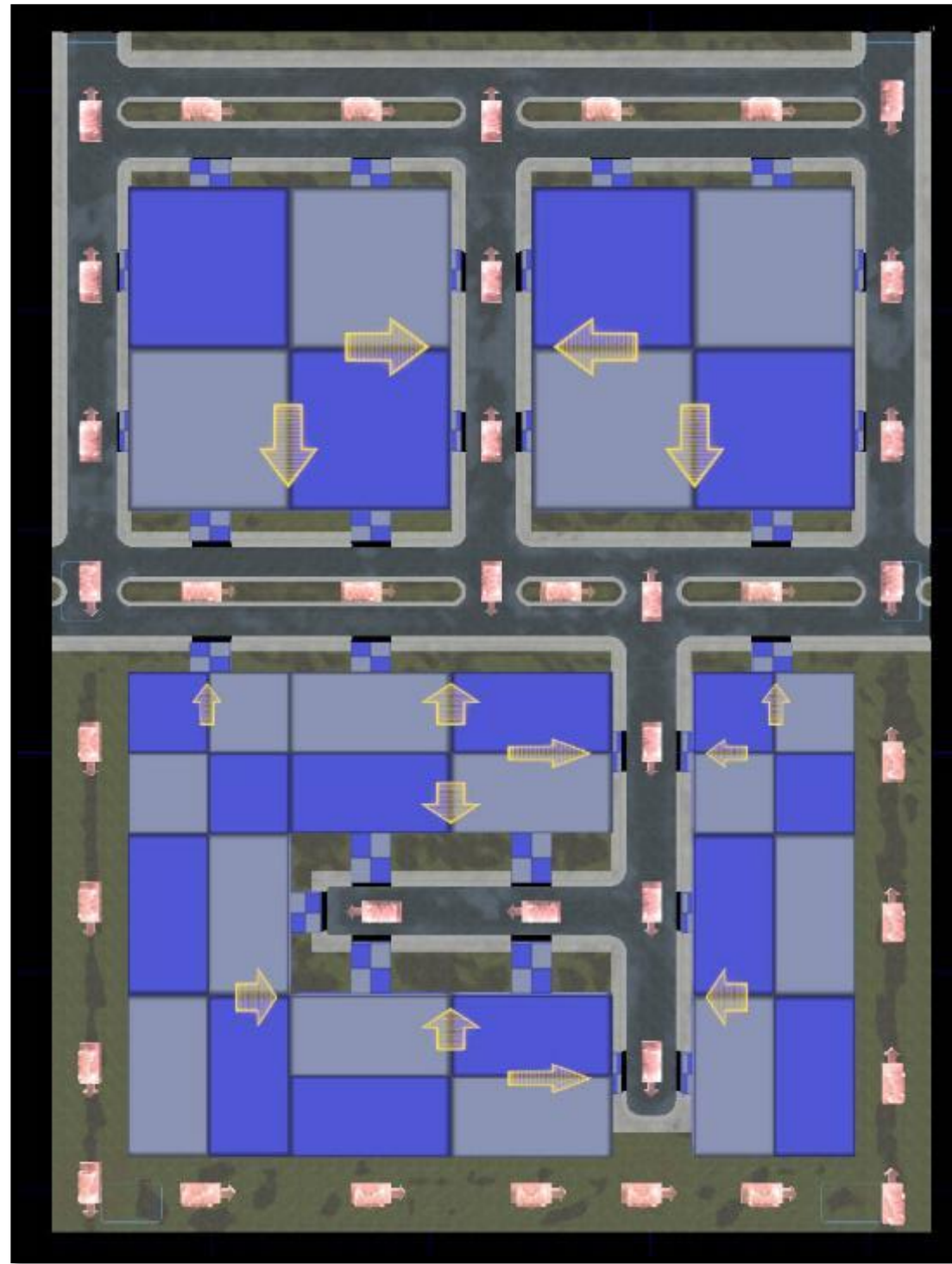
Zoning





Plot Iteration

- How big do these maps need to be?
- Map components not mathematically compatible
- Layout rules relaxed





Asset Swapping

- Original plan was three separate wilderness plot types: temperate, arid, tundra
- Asset swap system design:
 - All outdoor maps created as temperate
 - Assets and materials would swap if map loaded into arid or tundra plot





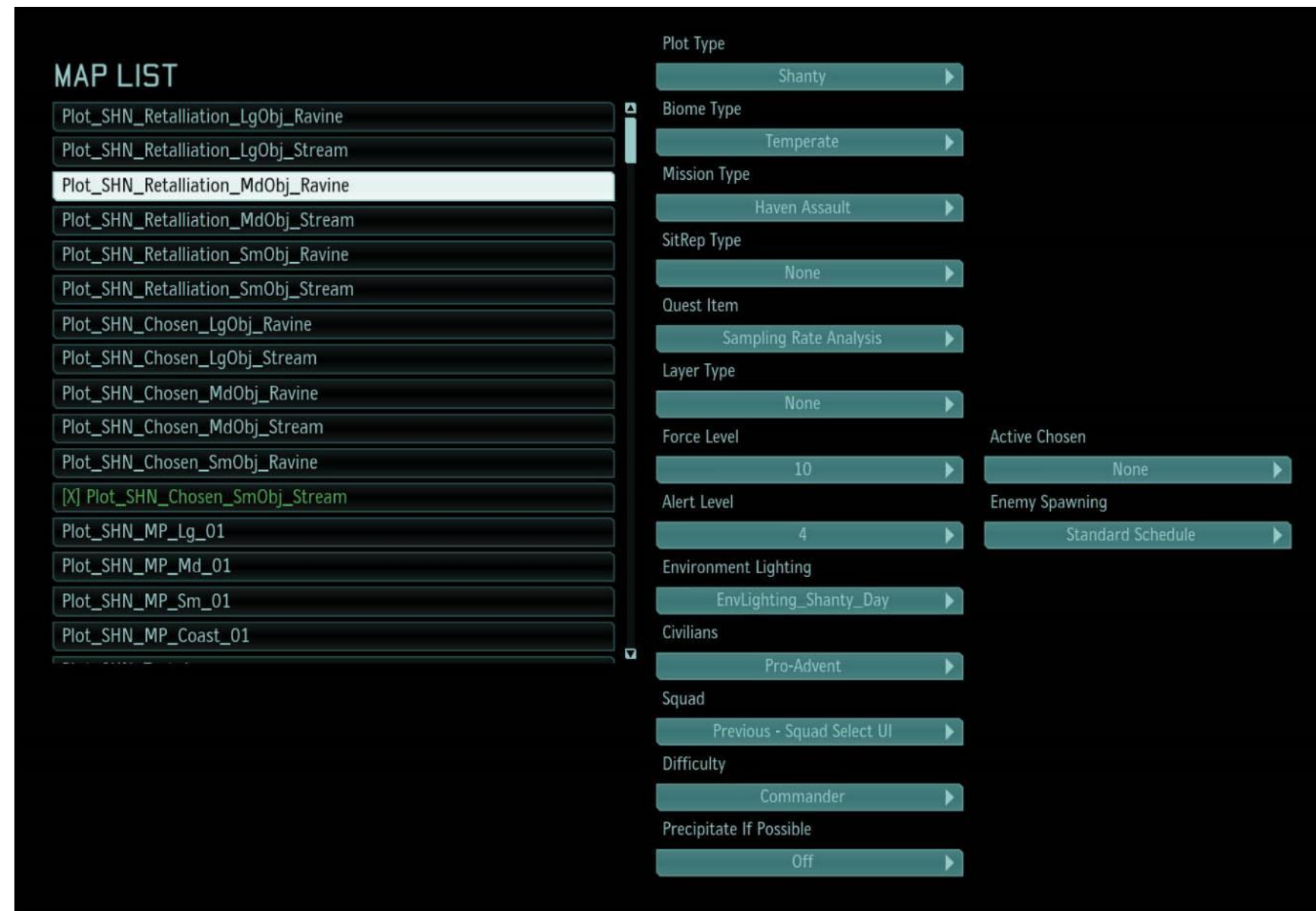
Asset Swapping





Tactical Quick Launch

- Developer tool for map generation
- Can manipulate parcel content after loading the plot



Start Battle

Generate Map

Choose Map Data

Toggle Map Size

Choose Squad

Turn On Debug Camera

Return To Shell

Reroll SpawnPoint

Start Challenge

Show Challenge Controls

Map Preset

None

Instructions:

1. Choose Map Data
2. Generate Map
3. Wait for map generation to complete
4. Start Battle or Clear Map



First Major Challenge

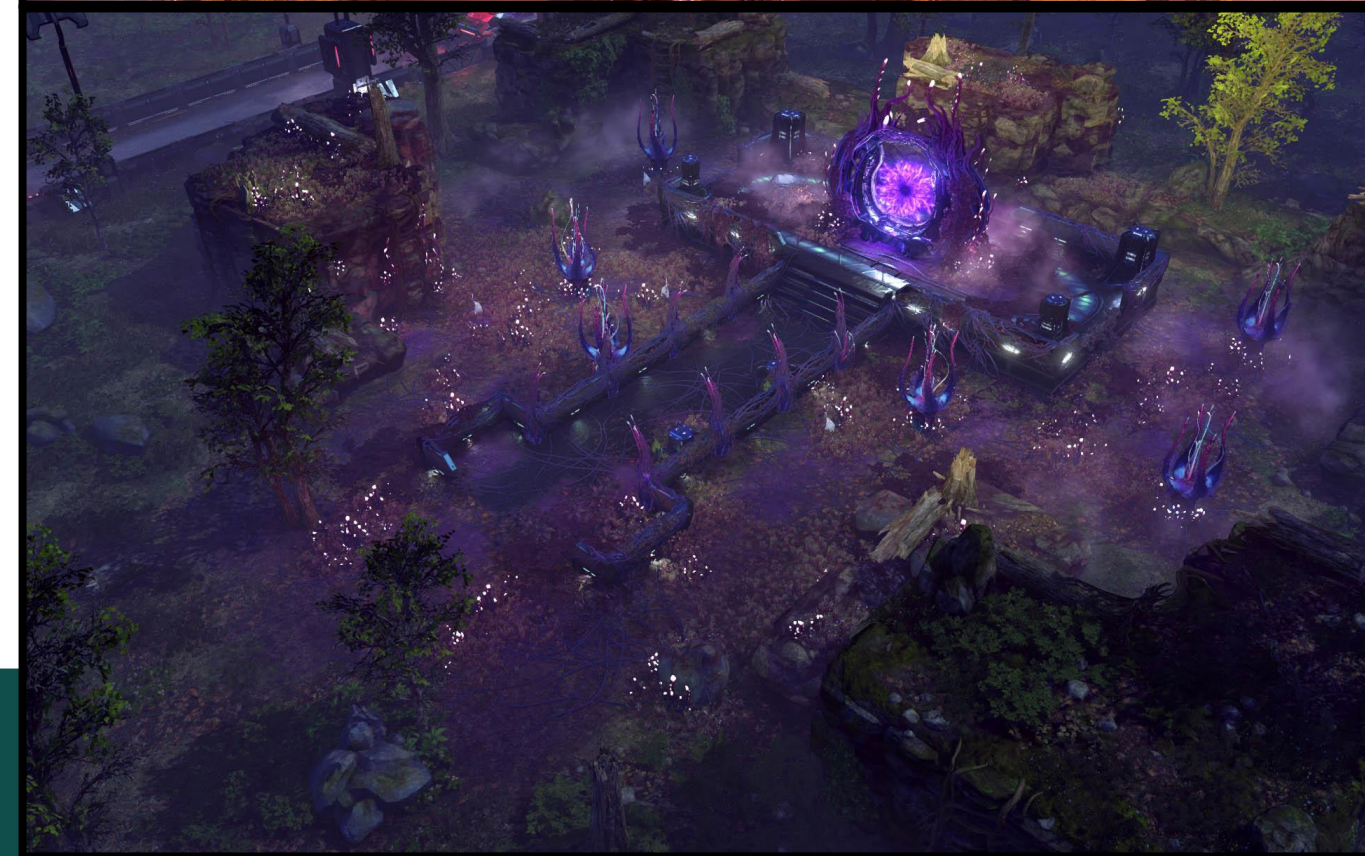
- Late production major design iteration adjusted mission locations
 - Specific missions only on specific plot types
 - All plots had to be remade to support this
- Because of procedural system:
 - One week of a level designer's time
 - Art schedule unimpacted
 - Not possible on EU without slipping schedule





Golden Path Missions

- Late production addition
- Less procedural
- Fixed narrative elements

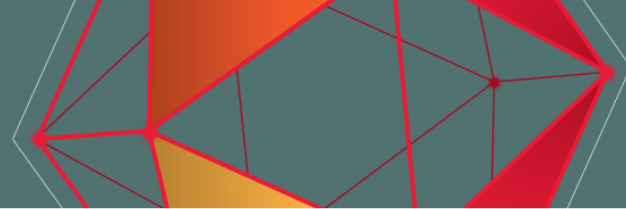




Slums

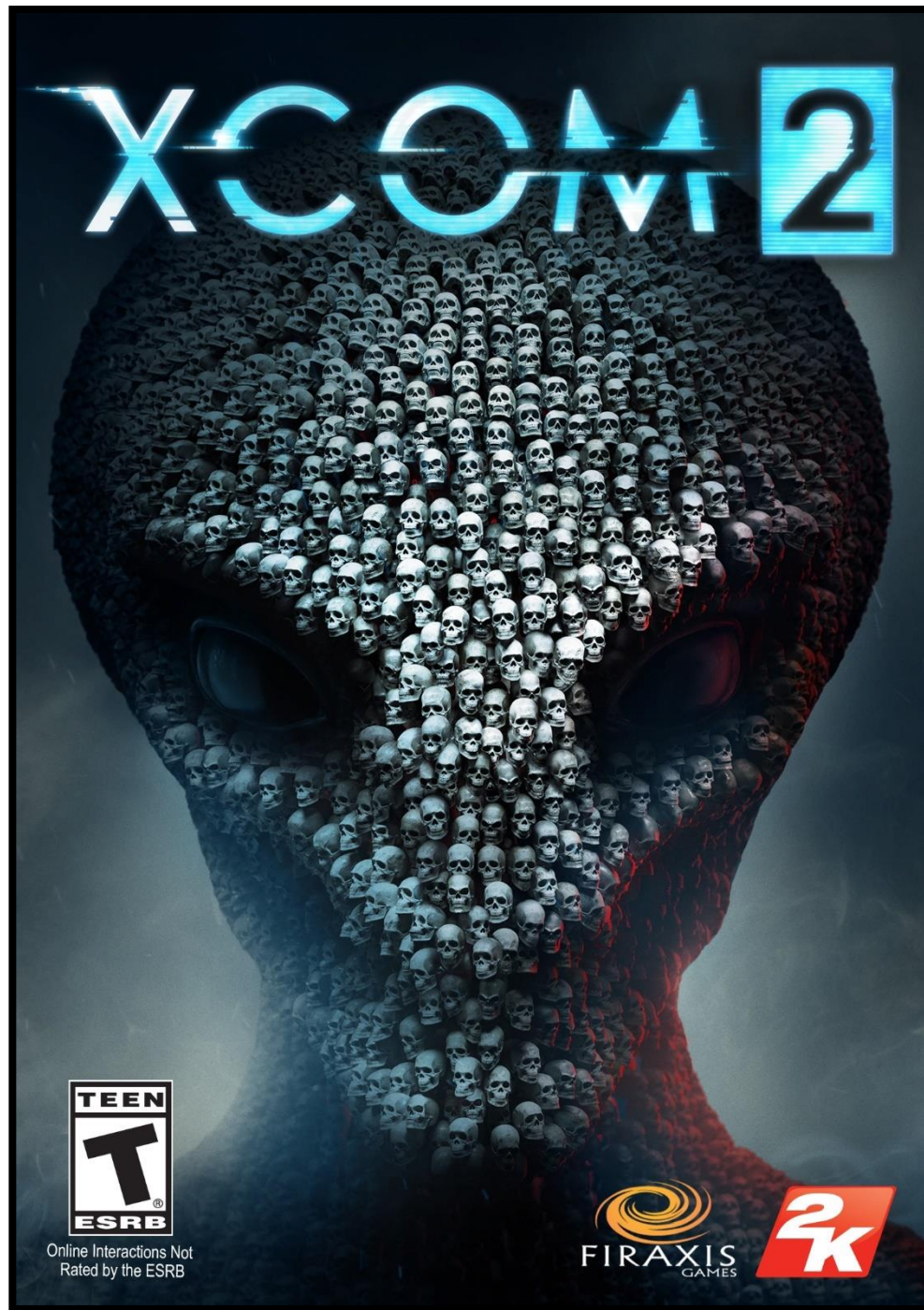
- Late production feedback: not enough visual variation
- What if we added another plot type?
- Not enough time to create full set of supporting maps
- How many do we need?

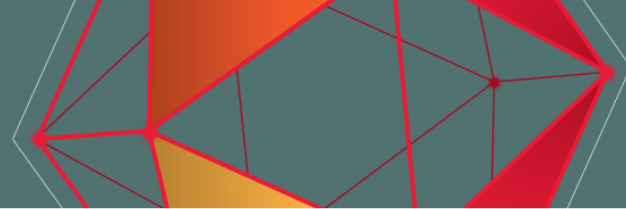




Taking Stock

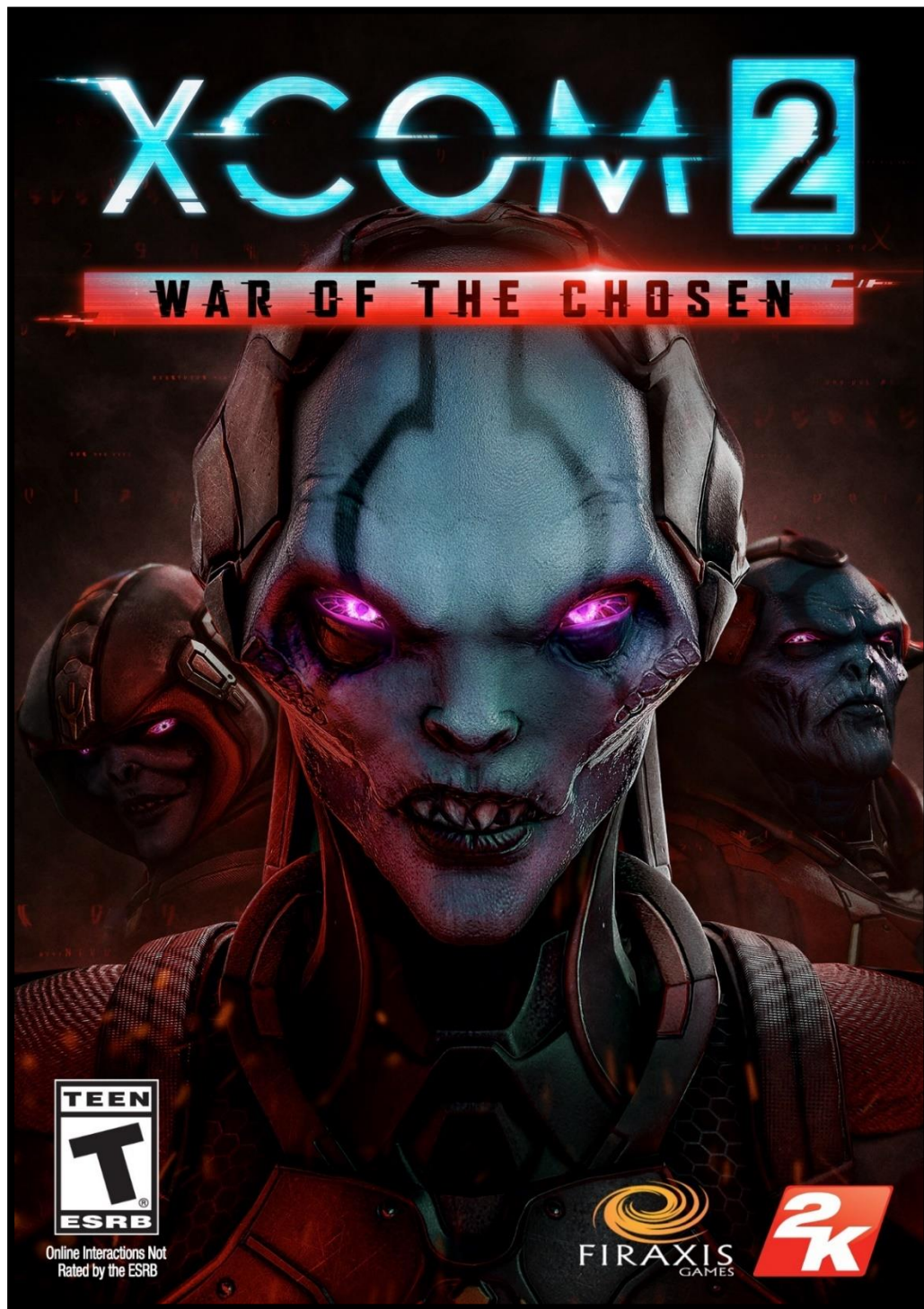
- XCOM 2 Shipped with 80 plots
- Over 200 Parcels and 450 PCPs supporting
- How many maps did we need?





War of The Chosen

- Adding gameplay variation to existing plot types
- New plot types to support new missions





Abandoned Cities



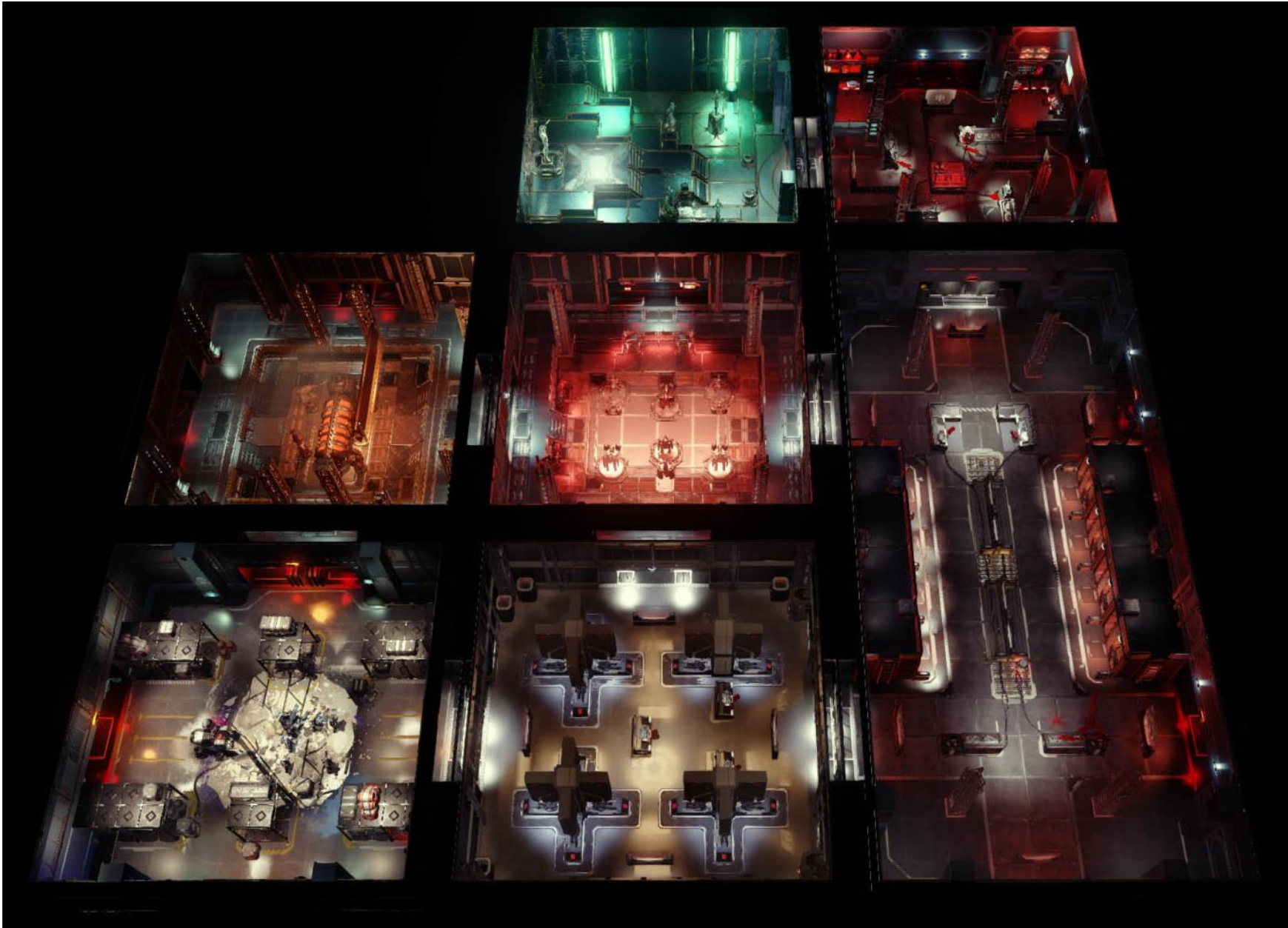
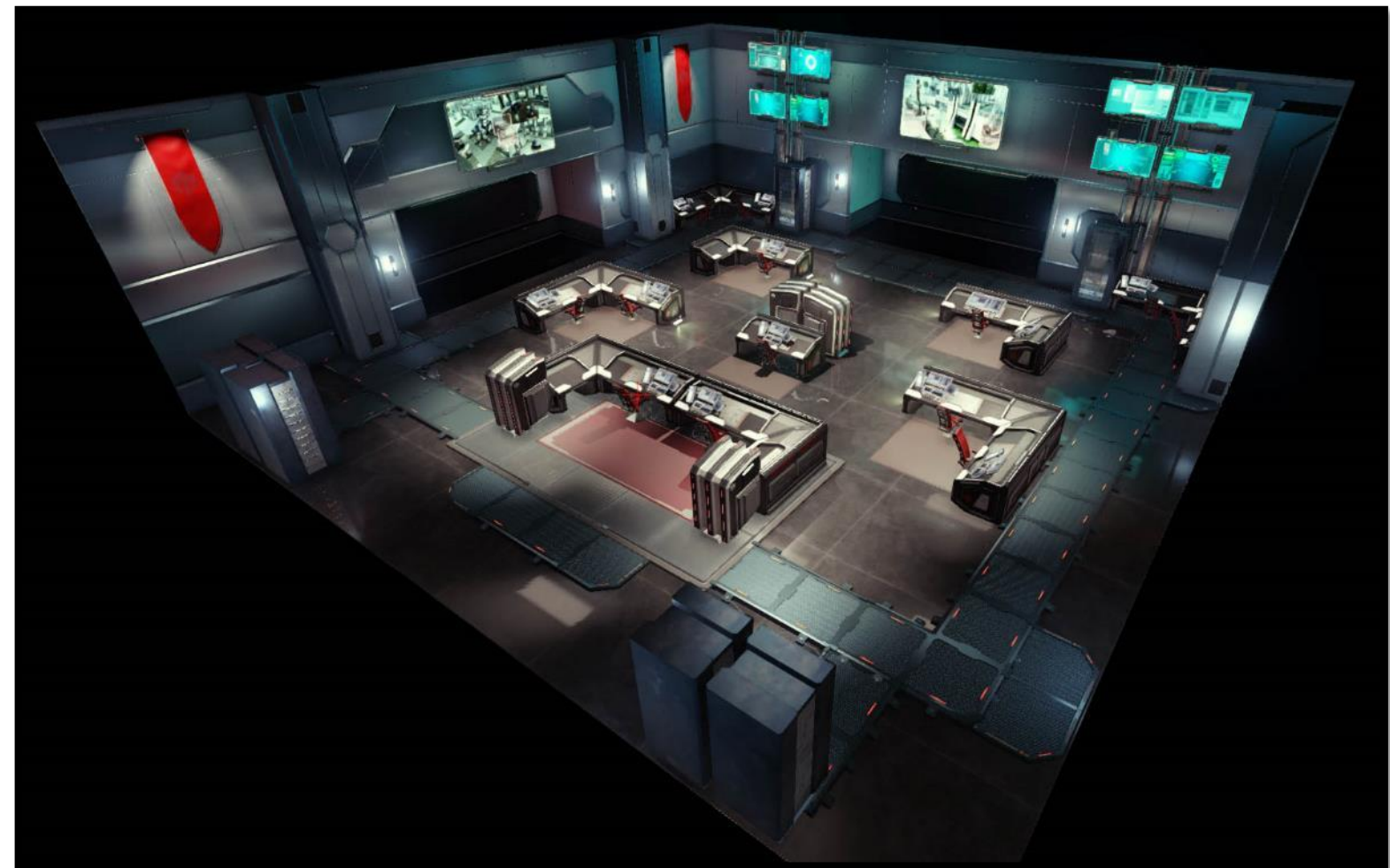


Tunnels



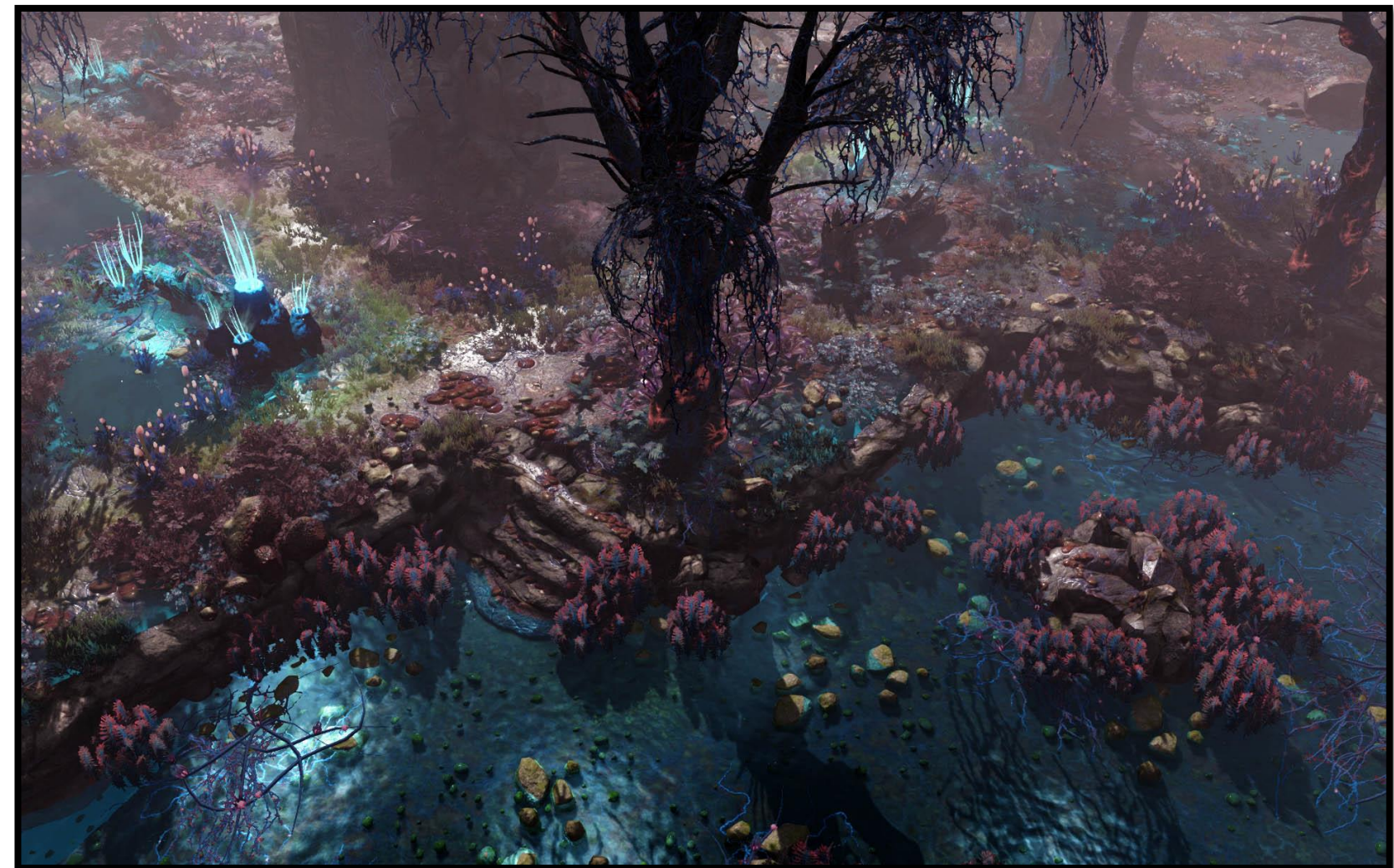


Chosen Strongholds





Xeniform Biome





Expansion Iteration

- Adding gameplay variation to old plot types
- Unique PCP sets created
- Improving concealment

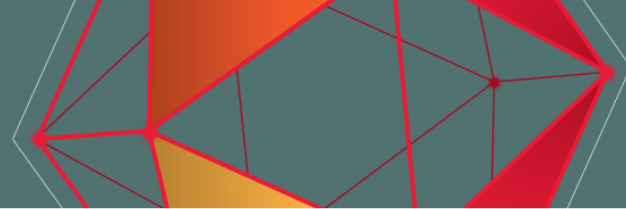




Pros and Cons

- Advantages
 - More for less
 - Easier iteration
 - More impact from adding post-release content
 - Easier for modders
- Disadvantages
 - Limited artistic agency
 - Cinematic unpredictability
 - Decreased opportunities for visual storytelling





Final Thoughts

How procedural does it need to be?





Questions?

