**Goldilocks Litepaper 1st Draft**

**Please don’t circulate – work in progresss**

**Introduction**

Goldilocks is a defi project on Berachain. Amongst other things, it aims to (i) create the most effective monotonically rising price floor mechanism seen yet in defi, (ii) allow for liquidation free yield bearing loans, (iii) incentivize large amounts of long term liquidity and tvl on berachain, (iv) build a rich ecosystem around yield bearing positions in Berachain consensus vaults, and (v) distribute porridge to beras.

1. **LOCKS**

**1.1 FSL and PSL**

The first main aspect of Goldilocks is the LOCKS token and the custom built AMM through which it trades. The AMM is built on top of two liquidity pools, the `floor supporting liquidity’ (FSL) and the `price supporting liquidity’ (PSL). For expository purposes, we will assume that the only currency that can be deposited into the FSL/PSL is HONEY, but we’ll circle back to that assumption later on.

PSL

FSL

**1.2 Minting and Burning**

The AMM has the ability both to mint and to burn LOCKS tokens through the following mechanisms.

1. Firstly, a user can always redeem a LOCKS token in exchange for a proportional share of the FSL. More precisely, if S is the total supply of LOCKS, then the AMM allows a user to redeem 1 LOCKS token for a quantity of HONEY equal to FSL/S. We call FSL/S the `floor price’ of LOCKS, since it represents a minimum price for which a LOCKS token can always be redeemed at the AMM. Upon redemption, the AMM burns all the redeemed LOCKS tokens, ensuring that redemption can never lower the floor price of the remaining tokens. In fact, the whole protocol is built to ensure that the floor price can never decrease, and is in fact constantly increasing.
2. As well as burning LOCKS for the floor price, users can also `sell’ LOCKS to the AMM at the market price (determined by the protocol), which will always be at least as great as the floor price. In that case, they will burn their tokens in exchange for a proportional share of the FSL as well as some amount of the PSL (see below for a description of how the market price is determined by the AMM).
3. Finally, users can `buy’ LOCKS from the AMM by paying the market price (never less than the floor price), in exchange for which the protocol mints them the appropriate number of LOCKS tokens.

**1.3 Market price function**

In order to ensure that the floor price never decreases, it is necessary to ensure that users can never buy LOCKS for less than the floor price (which would dilute existing tokens’ share of the FSL). Letting α be a function of the FSL, PSL and supply that is always greater than 1, the market price is determined by the following equation.

Market price = (FSL+PLS/Supply)\* α

This price function ensures that the floor price can never be diluted since users always pay more than the floor price to buy, and only withdraw the floor price from the FSL on sells.

We’ve seen how market price can be determined, how users can mint and burn LOCKS, and how the protocol ensures that the floor price never decreases. Now, the main goal of the protocol is to ensure that the floor price actually increases consistently over time. If a user LOCKS for $1 and the floor price increases above $1, then you they will always be in profit, whatever happens to the market price. The protocol uses a number of mechanisms to increase the floor price.

**1.4 Target Ratio**

Firstly, there is a `target ratio’ T such that when the ratio PSL/FSL hits T, the AMM transfers 10% of the PSL to the FSL, thereby increasing the floor price. When this happens, market price drops slightly (using the market price function above) but the floor price increases permanently – the AMM essentially locks in the gains of the token forever. After the floor raises this way, the PSL/FSL ratio will decrease back below T and a new target threshold is set at 1.1\*T. If the PSL/FSL ratio is stuck below T for a period of time, the protocol will gradually decrease T so that it becomes easier to reach it, thereby ensuring that the floor never stops rising. Specifically, the AMM decreases T by n% each day, where n is the number of days since the last time it hit T. This mechanism ensures that the market price doesn’t get stuck below the target threshold for extended periods of time.

* 1. **Sell tax**

Secondly, the AMM imposes a sell tax of 5% on all sales of LOCKS. 100% of this tax is directed back to the FSL, thereby ensuring that steep drops in market price are always accompanied by significant increases in the floor price. The sell tax also serves some important technical economic functions with respect to the market price function.

* 1. **AMM trading fees**

Like most dex’s, the AMM takes a small trading fee of 0.3% on all trading activity, all of which is sent to the FSL.

1. **STAKING**

**2.1 PORRIDGE**

The protocol also includes a staking mechanism for the LOCKS token. Importantly, staking rewards are not paid in newly emitted LOCKS tokens (which would dilute the floor price). Rather, they are paid in a second token, PORRIDGE. The PORRIDGE token gives owners the right to buy LOCKS from the protocol *at floor price*. So no matter what LOCKS’ market price is, if a user has one PORRIDGE token, they can use it to mint one PORRIDGE token through the AMM *at floor price*. Thus, the intrinsic value of PORRIDGE is the difference between LOCKS’ floor price and its market price. The bigger the gap, the greater the value of PORRIDGE. Crucially, these staking rewards can never dilute the floor price of LOCKS.

**2.2 Locking and Borrowing**

When a user stakes LOCKS, they can also borrow up to the full floor price of their staked LOCKS. For instance, if user has 100 LOCKS staked and the backing per LOCKS token is 1 HONEY, then they can borrow 100 HONEY from the FSL. Their staked LOCKS is then locked and can’t be withdrawn or sold until the loan is fully repaid, although the user will still receive staking rewards for their locked LOCKS. This means that when the market price is low, a user can buy LOCKS and immediately recoup nearly all of your investment as a loan against their staked LOCKS, and then receive the staking APR. For instance, if the floor price is 1 HONEY and the market price is 1.1 HONEY, a user can pay 1.1 HONEY to buy a LOCKS token, stake it, and borrow 1 HONEY against it and still receive the full yield of their 1 staked LOCKS token. The borrowed HONEY are still counted as part of the FSL for the purpose of calculating market price etc because they need to be repaid before the tokens that they are backing can be sold. Borrowing doesn’t dilute the floor price in any way.

Crucially, there is zero risk of liquidation with these loans. Users can borrow the floor price of their tokens, no more and no less. Since floor price can never decrease, there is never any need to liquidate users (compared to standard lending protocols where borrowing limits are determined by market price). Also, as the floor price increases, the amount that users can borrow is constantly increasing. This means that it is possible for users to take profits without ever selling their LOCKS tokens. Instead of selling, they can just borrow against the constantly increasing floor price. This allows them to avoid both the 5% sell tax of the protocol, and (in many jurisdictions) to also avoid paying capital gains tax on their profit, since loans (unlike sales) are typically tax exempt.

All loans come with a one of 3% origination fee. After the origination, the loans are completely interest free for their duration.

1. **LOCKS VARIANTS**

**3.1 Alternative Base Currencies**

Until now we have assumed that HONEY acts as the sole base currency of the Goldilocks AMM. While the primary LOCKS token will use HONEY as its base currency, there will also be numerous other LOCKS `variants’ built on top of other base currencies, all of which will work through the Goldilocks AMM in the same way as the basic LOCKS token. So for instance, there will be a BTCLOCKS token, whose PSL/FSL pools will contain BTC, and an ETHLOCKS token, and a BERALOCKS token etc. At the time of writing, the plan is to have one LOCKS variant corresponding to each of the assets that are accepted by the Berachain consensus vaults. These tokens will be rolled out gradually over the first few weeks and months after the launch.

As well as increasing trading volume on the AMM (thereby generating more revenue for the protocol), the LOCKS variant tokens will also allow users to increase exposure to e.g. BTC/ETH etc by investing in LOCKS. As the BTCLOCKS floor price increases (for example), users will gradually be able to borrow more and more BTC against their position, and since the loans are interest and liquidation free, they never need to repay and can treat the borrowed BTC as tax free profit.

**3.1 Yield Bearing Base Currencies**

It has been announced that staked consensus vault position will be represented as yield bearing ERC 4626 tokens. Depending on the technical details of this mechanism, we intend to use these yield bearing tokens as the base currencies of all LOCKS variants, i.e. instead of using plain BTC as the base currency, we will use the ERC 4626 token representing a position of staked BTC in the consensus vaults. This will allow BTCLOCKS buyers to earn yield both from the underlying yield bearing BTC position and from the staked BTCLOCKS.

1. **GOLDISWAP**

**4.1 Goldilocks DEX**

In addition to the custom AMM through which LOCKS and all its variants will be traded and managed, the protocol will also include an additional dex, GOLDISWAP, that operates on a more traditional liquidity pool model (most likely a simple uni v2 fork, although this is still being decided).

**4.2 Liquidity Incentives**

The basic purpose of the dex is to generate revenue via a standard trading fee of 0.3%, 100% of which will be directed back to supporting the floor price(s) of LOCKS and its variants. In order to generate trading volume that generates these fees, the protocol needs to incentivize significant amounts of liquidity on the dex. This is achieved through two mechanisms. Firstly, recall that the staking rewards for LOCKS are paid in PORRIDGE. Similarly, staking rewards for BTCLOCKS will be paid in BTCPORRIDGE and so on. As well as directing these PORRIDGE (and PORRIDGE variant) emissions to LOCKS (and LOCKS variant) stakers, the protocol will also direct a significant portion of those emissions to farms on GOLDISWAP. These high apr farms will incentivize liquidity, thereby generating trading volume and revenue, which will be directed back to the floor price of LOCKS and its variants. All farms will come with small deposit and withdrawal fees, which will be kept as protocol owned liquidity in order to support the longevity of the dex.

**4.3 Bonds**

In the first weeks after launch, the protocol will also offer bonds that pay PORRIDGE (and its variants) in exchange for LP’s for desired pairs. These LP’s will then belong to the protocol in perpetuity and will be used to generate trading volume and revenue for increasing floor prices.

**4.4. Bribes**

The protocol will incorporate a bribe mechanism that allows other projects to pay Goldilocks to direct PORRIDGE emissions to their chosen pools. It is not yet decided whether this will work in the standard way (by users getting paid directly to vote for specific pools) or whether it would work by other project paying bribes to the protocol itself, which would then direct all of the funds into the floor prices of LOCKS and its variants.

* 1. **Consensus Vault Liquidity**

Depending on the details of its implementation, Goldilocks aims to use Goldiswap as a liquidity hub for Berachain consensus vault positions. Bonds and initial emissions will be targeted at gaining as much liquidity as possible for pairs including e.g. BTC/ETH/USDC that is staked in the chain’s consensus vaults. This will serve both to differentiate Goldiswap from other dex’s on the chain, and to create synergies with the yield marketplace, described in the next section.

1. **YIELD MARKETPLACE**

The team are currently investigating the feasibility of creating a yield marketplace on top of Goldiswap and the custom AMM. The basic mechanism would work as follows. Users can take a yield bearing asset like locked LOCKS and deposit it into our yield splitting vault. In return, the vault mints two kinds of token for the user: one kind of token representing ownership of the deposited tokens themselves (OT), and another token representing ownership of the token’s yield (YT). At a later date, the user can redeem their OT and YT tokens (respectively) for the underlying token and the accrued yield. Alternatively, they can also swap the OT and YT tokens on Goldiswap. By selling YT, for example, the user effectively sells their claim to future yield whilst retaining their ownership of the underlying tokens. Goldilocks aims to make it possible to do this for all major yield bearing tokens on Berachain. As well as generating a 0.5% for every deposit into the vault, this will also drive trading volume on Goldiswap, where users will be able to effectively speculate on the value of future yields on Berachain.

1. **Initial Allocation and Presale**

The basic LOCKS token will launch around the time of the Berachain launch, shortly followed by LOCKS variants, Goldiswap and the yield marketplace. The details of the LOCKS presale are currently undecided, but a vast majority of funds raised will go to FSL, which will allow presale contributors to immediately borrow back a large percentage of their investment. Presale allocations will be given to early supports and partners of the project. No free tokens will be distributed to anyone other than the core team, who will receive 10% of the initial supply. All of these tokens will be locked for perpetuity, thereby ensuring that there are no free LOCKS tokens that can ever be dumped onto the market.

1. **Team Profit**

There are only two mechanisms through which the team will profit from the protocol. Firstly, the team will be allocated 10% of the initial supply of LOCKS (and its variants). These tokens will be locked in perpetuity and will never be sold. In fact, the team pledge to never sell a single LOCKS/PORRIDGE (or LOCKS/PORRIDGE variant) token. Rather, profit will be taken by borrowing against the floor price of the team tokens, which will never negatively impact market price or floor price. Secondly, the 3% loan origination fee for borrowing against staked LOCKS will initially be taken as the team’s salary. Crucially, the protocol is designed to ensure that the team never needs to dump tokens in order to profit from the protocol.